

**THREE ESSAYS ON THE FORMATION AND FINANCE OF
LOCAL GOVERNMENTS**

A Dissertation
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in the
School of School of Public Policy

Georgia State University and Georgia Institute of Technology
December 2011

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THREE ESSAYS ON THE FORMATION AND FINANCE OF LOCAL GOVERNMENTS

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To my wife, Bonnie. Her support and encouragement made this possible.

ACKNOWLEDGEMENTS

I've been honored to receive the help and support of several great people while working on my dissertation. I first want to thank David Sjoquist for his guidance over the past few years and for challenging me to stretch further than ever before. I also owe thanks to Bart Hildreth, who gave me very thoughtful and timely feedback that helped me figure out the way forward when I was feeling very stuck. I am very grateful for the efforts of the other members of my committee: Robert Eger, Jon Rork, Doug Noonan and Greg Lewis who all gave very useful advice on how to refine this work and where to take it next. I'm especially appreciative of Greg Lewis joining the committee at the very end and providing excellent feedback under a short timeframe. Finally, thanks go to my family and friends who have supported me throughout this program.

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SUMMARY

This dissertation follows a three-essay format. Each essay evaluates a different fiscal institution from a public administration perspective.

In the first essay I examine whether state-funded property tax exemptions are effective in reducing the property taxes. This class of exemption is characterized by a grant from state to local governments that is intended to replace property tax revenue and lower property tax payments. Two separate theories of local fiscal behavior predict that that price effects and fiscal illusion will reduce the effectiveness of this type of tax relief. I test these predictions using panel regression analysis on county-level data from Georgia. I find that only two thirds of the revenue allocated to this program is actually used for tax relief.

In the second essay I test a model of the property tax in which the levy is set to balance the difference between budgeted expenditures and expected receipts from all other revenue sources. This model demonstrates how the property tax can be used to offset unexpected changes to other revenues given a change in personal income. This model is contrasted with an alternative model in which expenditures are budgeted after expected total revenues have been determined. I will estimate both models for local governments in Georgia and test which more accurately describes local fiscal performance. I will also use both to predict changes to the property tax over a period of time and measure which model generated the more accurate forecast.

Unlike the first two papers, which are quantitative analyses of fiscal data, this chapter is a case study of the contract city model of governance as implemented in the

newly incorporated city of Sandy Springs, Georgia. I investigate whether the scope of outsourcing in contract cities creates additional challenges for city officials that manage contractor performance. I evaluate the incentive structures in the contract agreements that influence the principal-agent relationship using a textual analysis research method. I find that certain combinations of municipal functions in a single public-private partnership creates the potential for negative synergies to arise which would increase the difficulty of monitoring and managing the private partner.

CHAPTER I

INTRODUCTION

Fiscal institutions can be studied through a number of academic lenses. For example, an economic approach focuses on efficiency and equity, while a legalistic approach examines institutions' interaction with the rule of law. In this dissertation I examine three fiscal institutions from a public administration perspective. This means that I approach taxation and expenditure systems as public policies that can be evaluated in terms of their effectiveness and their unintended consequences. I am interested in how public officials respond to intergovernmental fiscal policies. I also explore how the tightly constrained budgetary environment of state and local governments affects fiscal policy.

I have structured this dissertation as three separate manuscripts. The first two essays employ the tools of public economics to evaluate state and local property tax policies. The third is rooted in public financial management and is a case study of the principal-agent dynamic in the contract city model of municipal governance. Despite the differences among the essays in their disciplinary background and their research methods, these studies are united by their focus on the impact of fiscal policy on the behavior of public officials. This multidisciplinary approach and the focus on public financial management helps distinguish my research program from traditional public economics.

The Homeowner's Tax Relief Credit

All states have implemented policies intended to provide property tax relief to homeowners. As of 2007, 47 states offer homeowners either a homestead exemption or a

credit, 34 states have circuit breakers and 26 states allow deferrals on property taxes owed (Baer 2008). While some of these policies are simply regulations that restrict local procedures for calculating the tax for a given property, many tax relief programs transfer state funds to local governments to replace property tax revenues. However, if local governments are able to use these grants for purposes other than property tax relief, then state-funded relief programs may yield little actual reduction in taxpayer burden and may even increase the level of property taxation.

This essay evaluates one specific type of property tax relief program – a state-funded homestead exemption. These programs generally consist of a fixed property tax exemption specified by the state that is paired with a grant to local governments to offset lost revenue. Duncombe and Yinger (2001) identified 13 states with some form of state-reimbursed exemption, though seven of them only funded exemptions to special groups, such as residents over 65 years of age or veterans. For states that fund general homestead exemptions for all homeowners, Duncombe and Yinger note that state expenditures can become quite large. In fiscal year 2008-09, California paid out \$442.5 million to local governments to fund a \$7,000 general homestead exemption.

I examine whether state-funded homestead exemptions provide tax relief to homeowners, or whether local officials ‘capture’ the reimbursement funds by raising property tax rates. Two factors appear to make the latter outcome likely. First, the structure of the relief grant gives local officials an incentive to raise their property tax rates because the size of the grant depends on the local millage rate. Increasing the tax rate results in a larger transfer from the state. Second, because the revenue replacement grants are paid directly to local governments, taxpayers may not be fully aware of the

amount of funds received. If taxpayers do not know how much tax relief they should receive from the exemption, local officials may be able to capture the grant by raising property tax rates and achieve a higher level of overall revenue from the grant and the property tax. The result is that some state funds designated for reducing the property tax burden through a homestead exemption instead are used to increase local spending.

I evaluate the HTRC based on its effectiveness at providing property tax relief. Does the grant actually replace property tax revenue or do local governments use property tax relief funds to boost spending? I examine the effects of the grant on the level of revenues, the share of revenues derived from the property tax and on the property tax rate. I estimate the effects using a panel of county governments over a 12 year period. The results indicate that approximately a third of HTRC funds are employed by local governments to raise local spending.

The Residual-Rule Model of Property Tax Determination

In this essay I analyze how the property tax is used by local governments in an environment without binding tax limitations. If local officials are able to use the millage rate and assessment practices to achieve a desired property levy, what set of rules or behavioral patterns would they follow as they use this power? One model of property tax rate determination is the ‘residual rule’. Under this approach the property tax levy fills the gap between budgeted expenditures for the year and projected receipts from all other available revenue sources. Local officials set the property tax millage rate so that the tax yields just enough revenue to balance the budget. An implication of adhering to this rule is that in the event that other local revenues fall due to a recession the property tax rate will need to be raised in order to replace the lost receipts. This behavior allows the local

government to stabilize its overall revenues by increasing the short-term volatility of the property tax. The pursuit of stability for the local government comes at the cost of homeowners' ability to predict their annual property tax bills.

In contrast to the 'residual rule' model, an alternative model of property tax growth predicts that receipts will grow in proportion to the property tax base. This model predicts less volatility in the yield of the property tax and no role for the property tax in counter-balancing cyclical volatility in the other local revenue sources.

The research objective of this paper is to compare these two models empirically in order to determine which model more accurately describes the pattern of changes to the millage rate and variation in the overall property tax levy. The policy implications for following the 'residual rule' approach are significant because it would demonstrate a tradeoff between overall stability in the tax structure and the predictability of the property tax. Stability is a concern for ensuring the adequacy of local fiscal policy across economic cycles, while predictability is a concern for taxpayers who want to know their future tax liability and for policymakers interested in the political viability of their tax regime. The danger of following the 'residual rule' is that local officials that use the property tax to smooth their budget may surprise taxpayers with unexpected changes to the levy and incur political costs that threaten the sustainability of financing services through the property tax.

The primary contribution of this paper is to deepen our understanding of the role of the property tax in local tax structures during times of economic volatility. The underlying questions asked are how do local policymakers use the property tax to promote an adequate and stable fiscal structure and what are the implications of this

approach? The framework outlined in this paper describes an interconnected revenue system in which the relative responsiveness of public expenditures and non-property tax revenues to changes in personal income, along with the share of revenue provided by property taxes, will determine the size of the shift in property levies local tax officials will have to impose in order to comply with their budget balancing rule. This model predicts the size and the direction of the changes to the property tax levy local officials will make in order to offset shocks to their other revenue sources and stabilize the overall revenue stream.

I test this budget balancing model against an alternative model that assumes that the property levy is independent of other revenue sources and is instead determined by growth in the tax base. Policy makers following this alternative model do not use the property levy to stabilize their overall revenues in response to short-term economic shocks. I estimate both models using data from Georgia school districts and then generate predicted property tax levies to determine which model is able to generate more accurate revenue projections. I find that the budget-balancing model is better able to predict property tax revenues for the districts that have higher incomes per capita and higher populations as well as those districts that rely on the property tax for a larger share of their revenues.

The Contract City Model of Municipal Governance

The rise of the contract city as a new form of municipal governance presents many thorny issues for the theory and practice of public management. The contract city model is an extreme form of municipal outsourcing in which the city enters into comprehensive private partnerships for the production of the majority of municipal

functions. On the practitioner side, cities adopting this model of service delivery see the role of the city manager shift from administering public resources to monitoring and enforcing contracts (Prager 2008). For researchers interested in the theory of public contract management, this form of government challenges the conventional approach to studying internal vs. external production decisions. The question shifts from whether a single service function is a candidate for external production (see for example Levin & Tadelis, 2007), to whether a large set of service delivery and managerial functions can be outsourced at once. A key difference between the two models of governance is that rather than evaluating the economic merits of outsourcing each function individually, contract city managers choose the overall service delivery regime and contract for an array of services. Additionally, limited competition in the market for the private production of municipal functions, forces contract city officials to evaluate bids from a small set of potential service providers who are willing and able to undertake the production of the bulk of municipal functions.

In this essay I investigate the implications that the contract city model of governance has for contract management. It raises questions such as: does the scope of this type of public-private partnership facilitate interactions between outsourced functions that create greater contract management problems than would have otherwise existed if the services were provided by different partners? Are there synergies among certain municipal functions that when they are outsourced together increase the difficulty of contract management by creating the potential for conflicts of interest? Does the design of the actual contracts between contract cities and their private partners reflect the unique managerial challenges that could arise with this scale of outsourcing?

I investigate these questions through a case study of the initial contracts signed by the city of Sandy Springs, Georgia with its primary contractor, the private firm CH2M Hill. I identify three key categories of municipal functions that are interrelated and, when outsourced to a single private partner, create the potential for a conflict of interest. These three functional categories are: 1) the production of direct services, 2) the creation of managerial and financial information and 3) administrative and control functions. My analysis of the contract documents indicates that combining this broad scope of services in a single public-private partnership creates the potential for “negative synergies” which raise the cost of monitoring and managing contractor performance above what would be required if the functions were individually outsourced to separate contractors. I also identify beneficial structures that can counteract some of the adverse incentives created by the scope of the contracts. These features would not be present in the contracts associated with traditional municipal public-private partnerships that do not exhibit the same scope of outsourcing. The identification of these interrelationships between municipal functions can inform the design of contracts, especially when determining how contract cities should allocate functions across various private partners.

CHAPTER II

DO STATE-FUNDED PROPERTY TAX EXEMPTIONS ACTUALLY PROVIDE TAX RELIEF?

“While the [grant program] had great motives initially – to reduce the local tax burden – it has not worked out that way.” Governor Sonny Perdue (Salzer, 2008)

Introduction

All states have implemented policies intended to provide property tax relief to homeowners. As of 2007, 47 states offer homeowners either a homestead exemption or a credit, 34 states have circuit breakers and 26 states allow deferrals on property taxes owed (Baer 2008). While some of these policies are simply regulations that restrict local procedures for calculating the tax for a given property, many tax relief programs transfer state funds to local governments to replace property tax revenues. However, if local governments are able to use these grants for purposes other than property tax relief, then state-funded relief programs may yield little actual reduction in taxpayer burden and may even increase the level of property taxation.

This essay evaluates one specific type of property tax relief program – a state-funded homestead exemption. These programs generally consist of a fixed property tax exemption specified by the state that is paired with a grant to local governments to offset lost revenue. Duncombe and Yinger (2001) identified 13 states with some form of state-reimbursed exemption, though seven of them only funded exemptions to special groups, such as residents over 65 years of age or veterans. For states that fund general homestead exemptions for all homeowners, Duncombe and Yinger note that state expenditures can become quite large. In fiscal year 2008-09, California paid out \$442.5 million to local

governments to fund a \$7,000 general homestead exemption. Table 2.1 shows state expenditures for five state funded exemptions.

Table 2.1 Expenditures on State-Funded Homestead Exemptions¹

State	Fiscal Year	Expenditure (in millions)
New York	2009/10	\$3,249
California	2008/09	\$442
Georgia	2007/08	\$432
Indiana	2008/09	\$140
Iowa	2009	\$99

I examine whether state-funded homestead exemptions provide tax relief to homeowners, or whether local officials ‘capture’ the reimbursement funds by raising property tax rates. Two factors appear to make the latter outcome likely. First, the structure of the relief grant gives local officials an incentive to raise their property tax rates because the size of the grant depends on the local millage rate. Increasing the tax rate results in a larger transfer from the state. Second, because the revenue replacement grants are paid directly to local governments, taxpayers may not be fully aware of the amount of funds received. If taxpayers do not know how much tax relief they should receive from the exemption, local officials may be able to capture the grant by raising property tax rates and achieve a higher level of overall revenue from the grant and the property tax. The result is that some state funds designated for reducing the property tax burden through a homestead exemption instead are used to increase local spending.

¹ See New York State, Executive Budget Briefing Book – STAR (New York State, Division of the Budget 2008); California Governor’s Proposed Budget (State of California 2008); Georgia Law 2007 HB 95 made an Act pp. 223; Iowa Detailed Budget Book Fiscal Year 2009 – Associated Financial Statements (State of Iowa 2009, p. 159); Indiana Appropriation HB 1001 (State of Indiana 2008)

I explore these issues by investigating Georgia's experience with the state-funded Homeowner's Tax Relief Grant (HTRC). HTRC was adopted in 1999 during a period of state budget surpluses to return excess state funds to taxpayers. It initially gave all homeowners a homestead exemption of \$2,000 of assessed property value, but the exemption increased and decreased multiple times between 1999 and 2008, and was \$8,000 when it was eliminated in 2008.

I evaluate the HTRC based on its effectiveness at providing property tax relief. Does the grant actually replace property tax revenue or do local governments use property tax relief funds to boost spending? I examine the effects of the grant on the level of revenues, the share of revenues derived from the property tax and on the property tax rate. I estimate the effects using a panel of county governments over a 12 year period. The results indicate that approximately a third of HTRC funds are employed by local governments to raise local spending.

This essay is structured as follows: The next section uses the existing literature on the impact of intergovernmental grants on the local public sector to develop a theoretical. Section 3 briefly reviews the empirical literature on approaches to measuring these impacts, while Section 4 provides greater detail on the Georgia Homeowner's Tax Relief Grant. I then cover the empirical strategy and discuss the data that I employ. In Section 6 I present my results; some concluding thoughts are provided in the final section.

Price Effects Created by Property Tax Relief

The median voter model assumes that the government selects the outcome preferred by the voter with the median preference, which are largely determined by how

the government's spending and taxing affect him/her. Holcombe (1989) provides a theoretical history of the median voter.

Initial Conditions Before The Exemption

Consider a local community with n households, where each household i receives an income of Y_i which is split between private consumption (X_i) and a publicly provided good (G_i) that is private in the sense of excludability and competitive consumption.² Z represents a vector of environmental and taste parameters. Taking X as a numeraire good, each household's preferred G is obtained by solving the following problem:

$$\begin{aligned} \max_{(X_i, G_i)} U^i(X_i, G_i; Z_i) \\ \text{s. t. } Y_i = X_i + p_i G_i q \end{aligned} \quad (2.1)$$

G_i represents the preferred level of G for the i^{th} person, and q is the marginal cost (which, for simplicity, is assumed to be constant and equal to one) of producing a unit of G . The public good is not purchased directly by households, but is funded through taxation. The p_i term represents household i 's share of the total tax revenue required to fund total government spending, given by $G_i q$. We assume that the property tax is the only source of public funds. Household i 's share of total property tax revenue is determined by its share of all property held in the community. This is defined as v_i/V , where v_i is the value of household i 's property and V is the total value of all local property. V is comprised of both homestead and non-homestead property.

² This presentation of the median voter model follows the notation used in **Tresch, Richard W.** *Public Finance: A Normative Theory*. Boston, MA: Academic Press, 2002. See Turnbull and Djoundourian (1994) for tests of the Median Voter Model's validity when applied to local governments.

Because the local government is required by law to maintain a balanced budget, expenditures on G must equal total revenues. A government with the property tax as its sole source of revenue balances its budget by choosing a property tax rate (t) such that total property tax receipts (tV) equals total government expenditures (qG). I assume that V and v_i are given and do not depend on t . Following the assumption that the marginal cost of producing the public good is constant and equal to unity (i.e., $q=1$)³ the government's budget constraint can be presented in a simplified form which omits q . This is displayed in equation (2.2).

$$G = tV \quad (2.2)$$

The homeowner pays tv_i in property taxes. Multiplying the numerator and denominator of tv_i by V shows the homeowner's tax payment in terms of a share of the total tax burden born by the community:

$$tv_i = tV(v_i/V) \quad (2.3)$$

By substituting (2.3) into (2.2) we obtain expression (2.4), which shows that homeowner i 's tax payment is its share of the total cost of the publically provided good.

$$tv_i = G \left(\frac{v_i}{V} \right) \quad (2.4)$$

³ There are two positions on whether to use this simplification in the literature with the main distinction being the research objective of the study. Authors focusing on the effect of intergovernmental transfers on the level of government expenditures or taxation have assumed unitary production costs, while those examining impacts on production efficiency, especially in the public education, have explicitly modeled how the marginal cost of G can change. As an example of the former category, Filimon, Romer and Rosenthal (1982) frame their discussion in terms of government expenditure and do not address the actual production of the public good in their theoretical model. Alternatively, in their studies of the impact of New York's state-funded homestead exemption on the efficiency of public schools, Duncombe, Miner, and Ruggiero (1997), Eom, Duncombe, and Yinger (2005), and Eom and Rubenstein (2006) have each modeled the production cost. The objectives of this paper align more closely with the former category.

The homeowner's tax price is the increase in property taxes associated with a marginal increase in public production. Taking the first difference of the right-hand side of (2.4) with respect to G shows that the tax payment will increase at the rate of the tax share. Because the marginal cost of production for G is assumed to be a constant rate of q , the marginal tax price will also be the average price. Therefore the tax price of local services for household i can also be obtained by dividing both sides of (2.4) by G . This is displayed in equation (2.5). This shows that the p_i term from equation (1) is also the homeowner's tax price.

$$p_i = \frac{tv_i}{G} = \frac{v_i}{V} \quad (2.5)$$

Effect of State-Funded Homestead Exemption

When the state implements a fully-funded homestead exemption, the taxable value of the homeowner's property is reduced by the value of the exemption (E) and the property owner's new tax payment is determined by applying the millage rate to this reduced value. To compensate the locality for the loss of revenue due to the exemption, the state government provides a grant that is equal to tnE , where n is the number of recipient homesteads.

The revenue replacement grant enters into the local government's budget constraint as a direct match for the taxes that the locality would have collected on the exempted property value. This relationship is depicted in equation (2.6). If the entirety of the state grant is applied to tax relief, then the local government does not change its property tax rate or level of spending.

$$G = t(V - nE) + tnE \quad (2.6)$$

$$\text{or,} \quad G = tV \quad (2.7)$$

The replacement grant reduces the share G that must be financed through the property tax. If we represent the homeowner's tax payment as a share of the revenue required to fund G , similarly to equation (2.4), we see that the exemption also reduces the individual homeowner's proportionate tax burden. The new individual tax share is the ratio between the taxable value of the homeowner's property after the exemption ($v_i - E$) relative to the sum of the total taxable value of the property base and the total property tax exemption $[(V - nE) + nE]$, because the replacement grant compensates local government for the reduction in their tax base due to the property tax exemption. Equation (2.8) shows this relationship between the homeowner's new property tax payment, $t(v_i - E)$, and the new tax share.

$$t(v_i - E) = G \left[\frac{(v_i - E)}{V - nE + nE} \right] = G \left[\frac{(v_i - E)}{V} \right] \quad (2.8)$$

There are at least two factors that may induce local governments to change the property tax rate in response to the homestead exemption. First, the exemption changes the tax price of local public services and would induce a substitution response on the part of the median voter. Dividing equation (2.8) by G yields the post-exemption tax price \hat{p}_i , shown in equation (2.9), which is less than initial tax price p_i .

$$\hat{p}_i = \frac{t(v_i - E)}{G} = \frac{(v_i - E)}{V} < p_i \quad (2.9)$$

I use the standard assumption that the median voter is also the owner of the median value home for a given jurisdiction. Thus, the median voter, facing a reduced price for public services provided by the local government, will prefer a higher share of public goods in her consumption bundle, the magnitude of the change being determined by the price

elasticity of demand for the public good. This increase in G will require an increase in t . Note that the percentage change in the tax price depends on v , in particular it equals E/v_i .

Second, local officials may raise property tax rates because a fiscal illusion effect hides the true level of taxation from the median voter. Filimon, Romer and Rosenthal (1982) develop this argument with a grant illusion model in which taxpayers have imperfect information regarding the true value of the transfers their government receives and officials exploit this ignorance to pursue a budget maximizing strategy. In their model, local taxpayers base their voting behavior on perceived aid \bar{A} and perceived government spending \bar{G} , rather than the actual values, which are denoted A and G . In their model Filimon et al. frame the relationship between real and perceived aid as a proportion determined by a fiscal illusion parameter ρ .

$$\bar{A} = (1 - \rho)A \quad (2.10)$$

The ρ term is a measure of the degree of fiscal illusion associated with intergovernmental transfers. I deviate from their approach, in which government aid is a lump-sum transfer, by adapting it to the case of a state-funded homestead exemption. In this case, the taxpayer will respond to a tax price based on her perception of the exemption amount. I follow the notation of Filimon et al. by denoting the perceived exemption \bar{E} as a share of the true exemption.

$$\bar{E} = (1 - \rho)E \quad (2.11)$$

Substituting \bar{E} into equation (9) results in a new tax price, \widehat{p}_i^* , that is less than \widehat{p}_i , for $\rho > 0$.

$$\widehat{p}_i^* = \frac{v_i - (1 - \rho)E}{v} \quad (2.12)$$

For the case where $\rho = 0$ then the perceived post-exemption tax price, \widehat{p}_i^* , is equal to \widehat{p}_i , the true post-exemption price⁴. If $\rho > 0$, the taxpayer will undervalue the homestead exemption, allowing the government to increase G . One possible cause for this form of fiscal illusion is if taxpayers are only attentive to the actual tax payment that they must make and ignore the property tax rate. Officials could then raise the property tax rate when E is set without increasing the taxpayer's tax payment relative to the pre-exemption levy, and thus capture the unobserved portion of E .

At least two studies within the public choice literature find that taxpayers have imperfect information regarding the property tax. In a survey of residents of three cities, Ordeshook (1979) found that citizens were significantly more accurate in estimating the amount they paid in property tax the previous year than the amount their tax bill would increase if their property tax rate increased by 5 mills. Lankford (1986) found that taxpayers voting on a property tax referendum in one school district believed the tax cost of services were higher than the true cost, which may have induced them to oppose the referendum more than they would have in the absence of fiscal illusion.

To see this how this type of fiscal illusion can be expressed in a model, consider the extreme case in which the taxpayer is completely unaware of the exemption, i.e., $\rho = 1$. In this case the taxpayer's perceived tax price for the publically provided good will be equal to the initial pre-exemption price ($\widehat{p}_{i|\rho=1}^* = p_i$). Thus, the median voter's preferred level of G will remain unchanged when E is set and the property tax bill for that

⁴ For the sake of clarity in distinguishing among different perceived tax prices, I denote the perceived tax price with $\rho = 0$ as $\widehat{p}_{i|\rho=0}^*$ and perceived tax prices at other levels of ρ similarly.

year will also remain constant. The household's property tax base, however, has been reduced to $V_i - E$. Given $\rho = 1$, local officials can raise the tax rate from the original rate, t , to a higher rate, t' , in order to maintain a constant tax levy, as depicted in equation (2.13).

$$tV_i = t' * (v_i - E) \quad (2.13)$$

At this higher rate of t' total revenue (15) will be the sum of the original property tax levy plus the revenue replacement grant $t'nE$. The entire grant would be dedicated to expanding public expenditures rather than replacing property tax revenue, as seen in (2.14).

$$G_2 = t'(V - nE) + t'nE \quad (2.14)$$

Taxpayers' perceived level of spending, $\overline{G_2}$, will remain at the initial pre-exemption level of spending, G_1 , because their perception is based on the actual property tax bill, which has remained unchanged⁵. By rearranging terms of equation (2.13) it is possible to express the increase in the rate associated with the fiscal illusion effect, as seen in (2.15).

$$\frac{t'}{t} = \frac{v_i}{(v_i - E)} = 1 + \frac{E}{(v_i - E)} \quad (2.15)$$

I depict the two extreme scenarios of perfect information ($\rho = 0$) and complete fiscal illusion ($\rho = 1$) in Figure 2.1. The initial public supply line is S_1 as seen from the median voter's perception. S_1 is horizontal given the constant marginal cost of the public expenditure function, reflecting that it costs the government one dollar of tax revenue to

⁵ Within this framework taxpayers would not notice any increase in services associated with the higher true level of spending.

finance one dollar of public expenditures, and the median voter's tax share is constant. D_1 is the median voter's initial demand for the level of public services. At the initial pre-exemption tax price p_i the median voter selects G_{1a} as the preferred public supply. With perfect information ($\rho = 0$) the exemption causes the tax price to decline to \widehat{p}_i , reflecting that with the grant revenue the government can finance a dollar of expenditures with less than a dollar of tax revenue. In this case the actual tax price is equal to the perceived tax price at full information ($\widehat{p}_i = \widehat{p}_{i|\rho=0}^*$). Voters, aware of the state subsidies to their consumption of public services, demand a new level of expenditures, G_{1b} , which lies further along their initial demand curve, D_1 . With full fiscal illusion, ($\rho = 1$), taxpayers believe that they bear the full cost of funding public expenditures and the perceived tax price therefore remains equal to the pre-exemption price ($p_i = \widehat{p}_{i|\rho=1}^*$). The government, however, is able to capture the grant and raise spending to G_2 . I depict the budget-maximizing bureaucrat's behavior as an outward shift in the demand curve, with the bureau as an additional consumer of public spending.

The graphical representation given in Figure 2.1 of the grant's effect allows for a refinement of the distinction between the rational price effect and the full flypaper effect. The segment AC represents the flypaper effect. The extent to which G_2 exceeds G_{1b} represents the spending in excess of what the median voter would have preferred to spend given full information of the true price ($p_i = \widehat{p}_{i|\rho=1}^*$) and given her income elasticity of demand for public consumption. This spending in excess of what would have been spent under full information is what I define as the net flypaper effect. The difference between G_{1a} and G_2 represents the total spending captured by the government due to the median

voter's ignorance of the replacement grant. This is equal to the sum of the rational price effect and the net flypaper effect.

Figure 2.1 Fiscal Illusion Effect on Public Expenditures

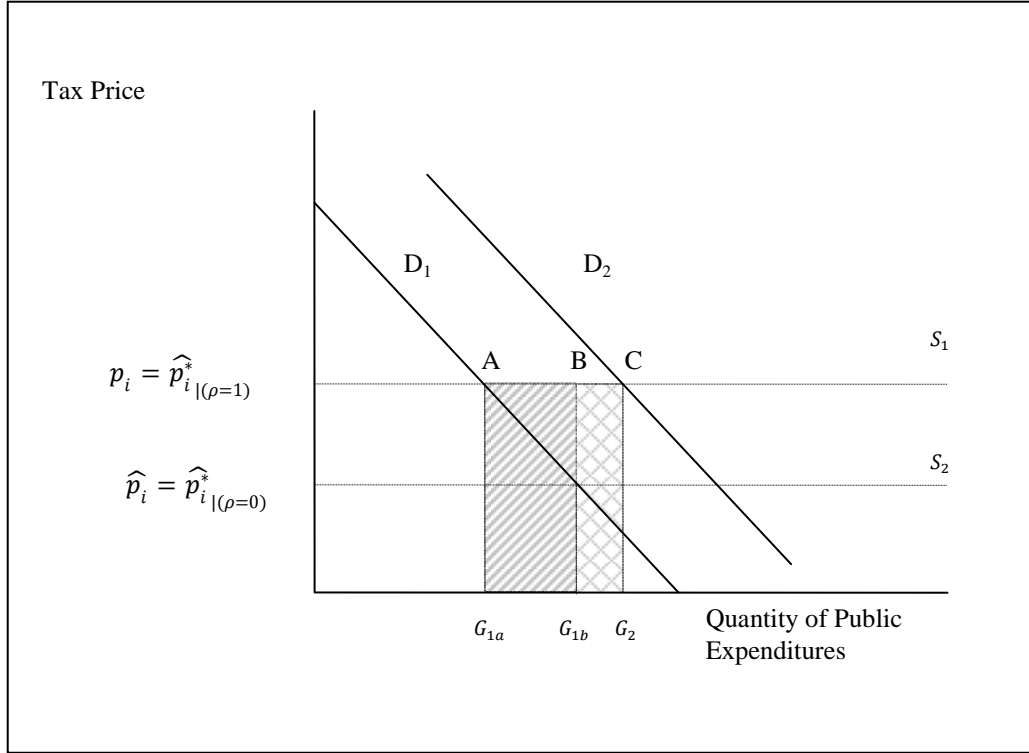
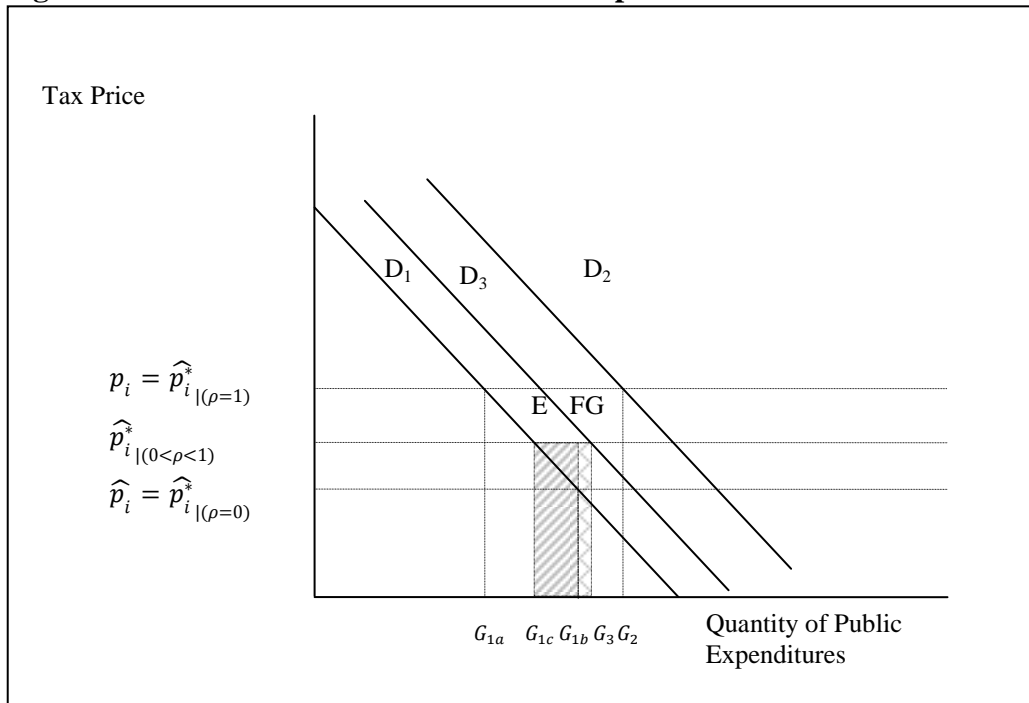


Figure 2.2 Fiscal Illusion Effect on Public Expenditures



Partial awareness of the grant results in a combination of both the price and fiscal illusion effects. I depict this outcome in Figure 2.2. The median voter perceives that the homestead exemption has lowered the price for public expenditures to $\widehat{p}_i^*|_{0 < \rho < 1}$ and, assuming that public services are normal, will demand an increased level of service along the original demand curve to G_{1c} . The full exemption has been granted, however, and the government's true cost of public expenditures remains \widehat{p}_i . The government is able to capture the unobserved portion of the grant by raising the rate to t'' and achieve spending level G_3 , where:

$$G_3 = t''(V - nE) + t''nE \quad (2.16)$$

The difference between G_3 and G_{1c} , or segment EG, represents the full flypaper effect, while the difference between G_3 and G_{1b} , or segment FG, is the net flypaper effect. To model how the flypaper effect is expressed through the tax rate in the partial illusion case, consider a hypothetical tax rate \bar{t}'' that would fund G_{1c} if applied to the unexempted tax base and to the replacement grant. This would be the rate that produces the perceived level of revenue.

$$G_{1c} = \bar{t}''(V - (1 - \rho)nE) + \bar{t}''(1 - \rho)nE \quad (2.17)$$

The taxpayers only recognize part of the exemption, but the government must still exempt the entire value of nE from the base. It can choose t'' , however, such that the revenue derived from the true taxable base $(V - nE)$ is equal to the revenue that would be raised from the perceived base taxed at rate \bar{t}'' . This is depicted in (2.18) and is the same concept as given in (2.13) for the initial case of complete illusion.

$$\bar{t}''(V - (1 - \rho)nE) = t''(V - nE) \quad (2.18)$$

Rearranging the terms of (2.18) yields for any value of ρ the change in the tax rate a government could enact to capture the entire unperceived portion of the replacement grant.

$$\frac{t''}{t} = \frac{(V-(1-\rho)nE)}{(V-nE)} = \left(1 + \frac{\rho nE}{V-nE}\right) \quad (2.19)$$

The ratio within the parentheses on the right-hand side of equation (2.19) compares the unobserved exemption to the taxable property base. This ratio depicts the percentage increase in the property tax rate enacted by the public officials to capture the unobserved portion of the grant. That term also describes the percentage increase in government expenditures caused by the fiscal illusion effect.

Because the value of the exemption, E , is set at the state level and is uniform across jurisdictions, the exemption will exclude a larger proportion of assessed value in localities with lower property values. While this means that the grant is progressively distributed, it also suggests that lower income jurisdictions may also be subject to a larger flypaper effect, given equal degrees of fiscal illusion (ρ) across all jurisdictions.

The median voter price effect and the fiscal illusion effect both operate to place upward pressure on property tax rates and the level of local public expenditures. These effects reduce the degree of tax relief achieved through a state-funded homestead exemption. The objective of this study, however, is to evaluate whether this class of exemption effectively delivers tax relief. While shifting the vertical alignment of the responsibility for generating revenues from local governments to the state can be a valid policy objective, the states that have implemented state-funded exemptions did so to relieve the property tax burden for the existing level of spending, not to subsidize further

public expenditures⁶⁷. If state funded exemptions fail to meet their intended policy objectives, then states may be better off pursuing alternative relief programs⁸.

Other Impacts of State Funded Exemptions on Fiscal Structure

State funded exemptions may impact local fiscal structure in other ways. Several authors have explored the determinants of the mix of revenues that local governments use, looking particularly at the factors which drive dependence on the property tax (e.g. Sjoquist 1981). Hettich and Winer (1984) propose a political cost model which depends on the median voter to determine the preferred level of expenditures, but which leaves the choice of revenue structure to rational officials that seek to minimize the political and administrative costs associated with generating revenue. Gade and Adkins (1990) apply this strategy in their analysis of state fiscal structures. State-funded exemptions may change the political cost of generating revenue through the property tax and thus induce officials to alter the tax structure.

The term “revenue structure” conveys two meanings in a political cost model. First, it applies to the specific characteristics of each individual source, such as its yield, political visibility, and administrative costs. Second, the tax structure refers to the

⁶ In his 2001 State of the State address Governor Roy Barnes advocated for expansion of the HTRC, “Last, but certainly not least we must continue to cut the taxes that Georgians pay, by increasing the homestead exemption on homes and family farms.” (Barnes 2001) The language Barnes uses emphasizes that the goal of the policy was to reduce actual property tax payments.

⁷ It has been suggested by a reviewer that the taxpayer may notice the additional state taxes that are required to cover the cost of the exemption. I assume that this is not a significant factor for this analysis for a few reasons. First, it would require a greater degree of price sensitivity to respond to a second-order price effect like this. Second, the argument assumes that if the grant went away that state taxes would be reduced accordingly. Rather, I assume that the grant is an allocation of state funds that would otherwise be spent on state programs or a different form of intergovernmental aid.

⁸ One alternative policy would have been to create a state income tax credit for property tax payments. This was proposed by Jerry Griffin, the executive of the Association of County Commissioners of Georgia. (Smith, 1999)

features of the overall system of different revenue sources. This includes the economies of scale in administering a larger and more complex tax system. It also refers to the cross-correlations in yield of different revenue sources across macro-economic cycles that reduce the overall variability in total revenues (Misiolek and Perdue 1987b; White 1983b).

The cost minimization process that political officials pursue can be expressed in the following fashion:

$$\begin{aligned} \min_{\{R_i/R\}} C(R_1/R, \dots, R_n/R, X) \\ \text{s. t.} \quad \sum_{i=1}^n R_i/R = 1 \end{aligned} \tag{2.20}$$

where C is a cost function inclusive of all political and administrative costs associated with generating total revenue R . The cost function is dependent upon the revenue shares obtained from each individual source R_i . The X term is a vector of exogenous factors that will determine the political costs associated with a given tax structure. Hettich and Winer (1984) include in this term the size of the potential tax bases, the costs to taxpayers in organizing opposition to the tax regime and the scale of the public sector.

Government officials pursue their cost minimization objective by adjusting the revenue shares until the marginal political cost of obtaining an additional dollar of revenue is equalized across all sources. The optimal revenue shares are defined as those which minimize total political cost for a given level of total revenue. Hettich and Winer do not specify an explicit cost function, but instead provide a reduced-form equation (2.21) in which the optimal shares, denoted with an asterisk, are influenced by the exogenous environmental factors. The authors then proceed to develop several

hypotheses about the direction of the effect of the various elements of the vector X on the optimal tax structure.

$$(R_i/R)^* = r_i(X) \quad (2.21)$$

It may be useful to provide a graphical description for this optimization procedure and how it can relate theoretically to intergovernmental tax policy. For the purposes of simplicity, define two revenue sources, the property tax (P) and an aggregate revenue source composed of all other taxes, charges and transfers (O). Let the cost function C shown in equation (20) describe a cost curve for a given level of expenditures. Following Hettich and Winer's hypotheses about political costs, the marginal costs associated with a given revenue source will increase as the proportion of revenues to the total revenue rises. This assumption will give the isocost curves the necessary concave shape.

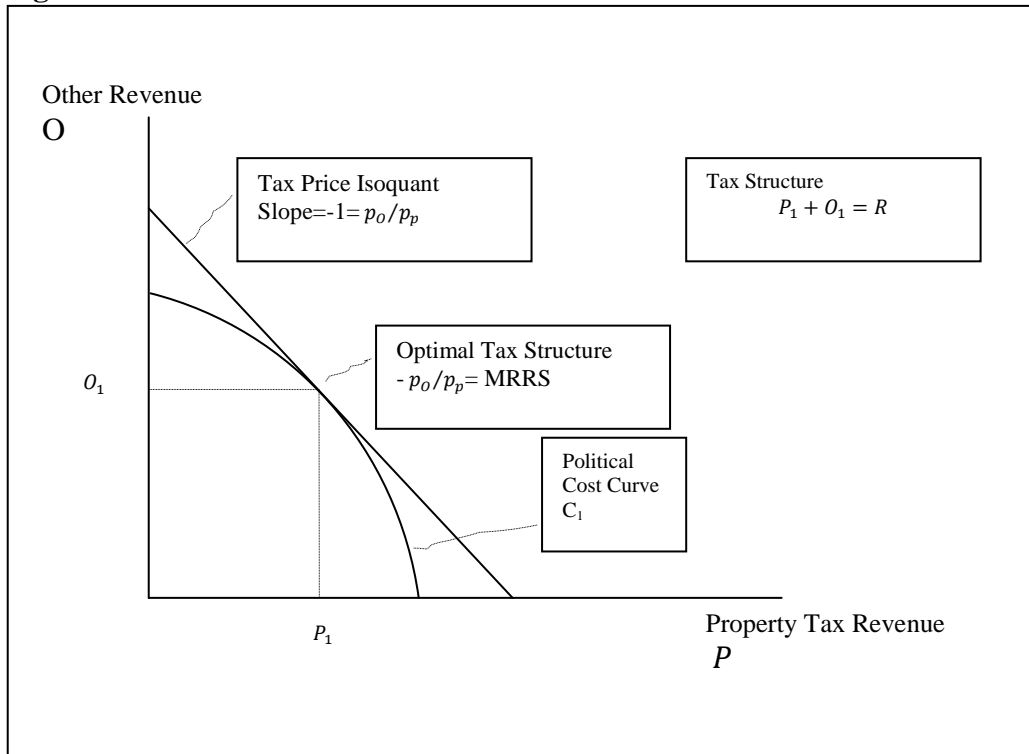
The slope at any point along this curve represents the ratio of marginal political costs between the property tax (MC_P) and the other revenues (MC_O). Define this ratio to be the Marginal Rate of Revenue Substitution.

$$MC_P/MC_O = MRRS \quad (2.22)$$

Now denote p_P and p_O as the tax prices for the two revenue sources. These prices represent the amount of revenue that must be generated from a given source in order to fund an additional dollar of public expenditure. In the absence of any matching intergovernmental grants, one dollar of tax revenue is necessary to fund one dollar of expenditure and thus the price ratio (p_O/p_P) will equal unity. The ratio of the revenue prices is the slope of the revenue isoquant for a given level of total revenue. This revenue isoquant reflects the government's budget constraint in which all spending must be financed through the two sources. To minimize the cost of financing a given level of

expenditures, the government will choose the revenue structure in which the MRRS is equal to the slope of the revenue price isoquant for the current level of total revenues (R). This structure is depicted in Figure 2.3 as tax structure (P_1, O_1) . Note that political costs decrease as one moves toward the origin.

Figure 2.3 Political Cost Minimization of the Tax Structure



A state-funded homestead exemption will reduce the revenue price for the property tax because the replacement grant allows the government to obtain a dollar of revenue with less than a dollar of local taxation⁹. To focus the analysis, I impose a

⁹ It should be noted that this framework for analyzing the supply side of public revenues could be extended to policies that raise the revenue price. One example would be revenue sharing policies in which the locality must rebate some revenues to the state for redistribution to less wealthy regions. This model predicts that this would lead the locality to reduce its reliance on that source. A question for future research that follows is whether governments that are subject to such price distortions have inefficiently designed

constraint that the overall level of revenues will remain constant and only the revenue structure will change. The reduction in the property tax's revenue price will change the slope of the revenue isoquant to $-p_o/\widehat{p}_p$, where $p_p > \widehat{p}_p$. As a result of this change, local officials seeking to minimize political cost will rebalance their revenue portfolio. From their local perspective, the impact of the grant is to reduce the amount of revenue that must be generated from local taxes to achieve a total revenue level of R . This puts the government on a lower political cost curve.

Figure 2.4. Political Cost Minimization of the Tax Structure

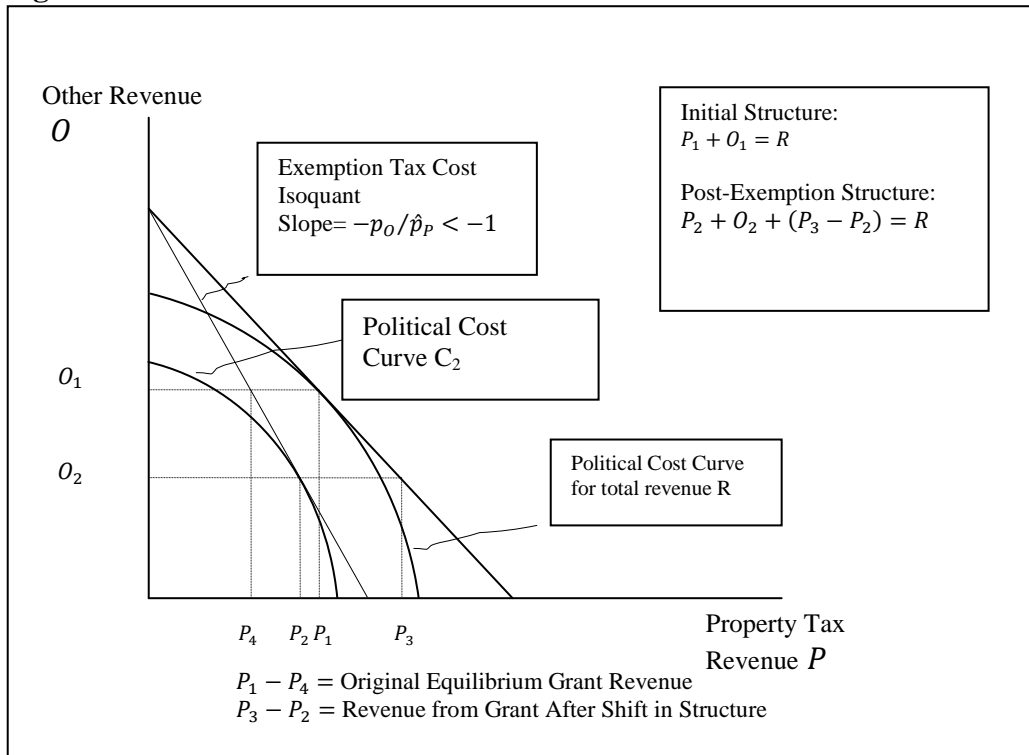


Figure 2.4 depicts the effect of the exemption on local officials' cost minimization strategy. The government chooses revenue structure (P_2, O_2) , which is the new point of

tax structures and are more likely to suffer from the problems of poor tax structure, such as higher revenue volatility and lower revenue growth.

tangency between the lower revenue isoquant and the political isocost curve. The grant is the vertical distance between the two isorevenue lines. At the original equilibrium, the grant would equal $P_4 - P_1$. But given that the state funded homestead exemption will change the political cost minimizing tax composition, the grant in the new equilibrium is $P_3 - P_2$. The effect of the homestead on the tax structure, therefore, is to increase the proportional use of the property tax.

Note that total property taxes in the new equilibrium, P_2 , are less than in the original equilibrium, P_1 . (It is possible to draw the isocost lines such that the new equilibrium would result in higher property taxes than in the original equilibrium.) However, property taxes in the new equilibrium are greater than the property taxes that would have been paid if the grant had been just used to reduce property taxes. In that case property taxes would have fallen to P_4 , which is less than P_2 .

In sum, state-funded homestead exemptions create changes in local fiscal structures across two different dimensions: the level of revenues and the mix of revenue sources. Both a median voter analysis and a political cost model predict that local governments will increase total expenditures and the property tax rate. Property taxes may fall but not by the full amount of the grant calculated at the original property tax rate. These effects would frustrate the intended purposes of providing tax relief that motivated states to adopt this type of program. In the remainder of this paper I test empirically whether these predicted outcomes hold for the case of a state-funded homestead exemption in Georgia.

Empirical Literature Review

In this section I review several empirical papers that address how to measure the impact of state and federal policies similar to the state-funded homestead exemption on local fiscal behavior.

Initial Empirical Studies

Two early efforts examined the effects of a property tax circuit breaker in Michigan. The state income tax credit offset a percent of property taxes that exceeded 3.5% of personal income, up to a maximum credit of \$1,200. The percent of taxes offset by the credit (a_{ij}) was age dependent, with 100% being abated for the elderly and 60% for the rest of the population. This lowers the marginal tax price of local services to $(1-a_{ij})$ for individuals paying above 3.5% of their personal income, up to the maximum credit level, after which the tax price returns to 1.

Fisher and Rasche (1984) explore the incentive effects of property tax relief by measuring the degree to which the program reduced the marginal tax price. As presented above, the marginal tax price for a given individual is $(1-a_{ij})$. Using a 1% sample of all state income tax returns from 1976, 1977, and 1978, the authors computed an average marginal tax price by county and by income class weighted by the share of individuals in each group at each value of a_{ij} . The statewide average reduction in the marginal tax price was 24%. Fisher and Rasche argue that this large change in the marginal tax price creates the potential for a significant incentive for local governments to raise property taxes. The effect on the level of the property tax is estimated analytically by reasoning that the new level of the property tax is determined by the percent change in the tax price and the price elasticity of demand for the property tax.

$$PT' = PT^0(1 + (1 - \omega)\sigma) \quad (2.24)$$

Where:

PT^0 is the pre-credit level of the tax

PT' is the post-credit level of the tax

$(1 - \omega)$ is the percent change in the net tax price

σ is the price elasticity of demand for the property tax

If C is the average amount of tax reduction from the credit, then the change in the level of the tax price can be described as:

$$\frac{PT'(1-C)}{PT^0} = \frac{(1-C)PT^0(1+(1-\omega)\sigma)}{PT^0} = (1-C)(1 + (1 - \omega)\sigma) \quad (2.25)$$

Because the amount of the credit is capped at \$1,200, the value of C was found by Fisher and Rasche to be 0.9. Using the calculated average change in the net tax price of 24% and test values for σ of 0.5 and 0.25, the authors predict modest changes in the level of the property tax, ranging from a 1% increase to a 5% reduction.

The Fisher and Rasche (1984) paper uses individual tax return data to look at how the Michigan circuit breaker changed the marginal tax price and created the incentive for potentially higher property taxes. Their study does not, however, test their predictions by comparing the calculated average post-credit tax prices with actual property tax receipts. That next step is taken in a later paper by Fisher (1988) with the primary objective of testing for a tax price effect. Fisher applies the median voter model to measure the effect of property tax relief on the indirect demand for local property taxes. He models this demand as a function of per capita income, the tax price of services and a vector of environmental and other preference factors. The effect of the credit is captured by using the average marginal tax price measure developed in the earlier Fisher and Rasche (1984) study. The indirect demand function is expressed in log-linear form in equation (2.26).

$$T_t = a + bY_t + cP_t + \sum_j d_j Z_{jt} + \varepsilon_t \quad (2.26)$$

Where

T_t =log of property tax in year t

Y_t =log of per capita personal income in year T

P_t =log of marginal per capita property tax price

Z_{jt} =log of a set of j taste and cost factors in year t

ε_t =the error term in year t

Fisher differences equation (25) over time in order to focus the analysis on how

the tax price effects the change in the property tax. This comparison is made across two years of data, 1974 and 1976. Although there was some amount of credit offered in 1975, the magnitude of the credit was increased significantly in 1976 and remained afterwards at that higher level. By comparing these two years, Fisher argues that he captures the effect of the full credit as it was ultimately implemented. Doing so also removes any community-specific fixed effects that would influence property taxes. This form is expressed by (27)

$$T_t - T_{t-1} = b(Y_t - Y_{t-1}) + c(P_t - P_{t-1}) + \sum_j d_j (Z_{jt} - Z_{jt-1}) + (\varepsilon_t - \varepsilon_{t-1}) \quad (2.27)$$

The cost and preference factors are implemented by using the annual number of students enrolled in public schools within the county and county population.

In order to provide a counterfactual for estimating the impact of the homestead credit, Fisher estimates a model of the predictors for the average county marginal tax price for three years after the credit had been implemented (1976, 1977, 1978) and then uses the resulting specification to forecast what the tax price would have been in each locality in 1974. The resulting prediction of the 1974 tax price is then used in the property tax demand function to calculate the predicted property tax level for 1974. This allows Fisher to estimate the differential change in the property tax from 1974 to 1976 due to the adoption of the tax credit.

Fisher estimates that the credit increased local property taxes between 1 and 8 percent. This finding suggests that a portion of the tax relief the credit offered was transferred to higher levels of local public spending. In terms of how the credit influenced the incidence of the property tax, Fisher argues that “residential taxpayers who did not receive a credit and nonresidential (except agricultural) property owners” experienced an increase in their share of the burden. This redistribution effect would also apply to state-funded homestead exemptions in states that apply uniform tax rates across all classes of property within a given jurisdiction. This point is reiterated indirectly by Eom and Rubenstein (2006) who note that the New York state-funded property tax exemption will cause “no change in the incidence of property tax in a school district, assuming tax rates stay the same.” By that logic, there will be a shift in burden towards property classes not eligible for the exemption if localities respond to state tax relief policies by raising their millage rates.

New York School Tax Relief Program (STAR)

The New York School Tax Relief Program (STAR) has been the subject of a series of papers that examine its impact on the level of property taxation and that have also focused on the impact of intergovernmental aid on the efficiency of local service production. These papers are of key interest because the STAR program is structured as a state-funded homestead exemption and the methods applied previously to measure its impact can be instructive to this and future studies.

In one of the earliest studies of the impact of STAR on local taxation policy, Duncome and Yinger (2001) focus on the distribution of reimbursement grants across jurisdictions by property value. A distinguishing feature of the STAR program is its

“sales price differential factor”, which gives high-property value jurisdictions higher exemption amounts per household. Duncombe and Yinger compare the distribution of benefits from the exemption with a power equalization grant¹⁰ by simulating the grants that school districts would receive under each program. A standard homestead exemption with uniform exemption amounts across the state has the potential for increasing the progressivity of the property tax. Duncombe and Yinger found, however, that the sales price differential factor in the STAR program increased the regressivity of property taxes across New York school districts by targeting aid to wealthier school districts.

Eom, Duncombe and Yinger’s (2005) paper also explores the impact of the STAR on local governments, with the specific objective of measuring the program’s effect on the efficiency of local service production. The authors test an earlier hypothesis posited by Duncombe, Miner, and Ruggiero (1997) that state aid, by lowering the tax price of services, reduces local taxpayers’ incentive to monitor the efficiency of local service production. Eom et al. test this hypothesis by measuring the degree to which the STAR program’s effect on the tax price impacted two measures of efficiency for local school districts. In the course of developing their theoretical model they also model the relationship between the tax price and the property tax rate. They employ a 2SLS panel data model to estimate the determinants of district expenditures per pupil, treating the determinants of production cost as endogenous variables. Using the results of their estimates for the impact of the STAR tax price on school efficiency, they perform

¹⁰ A power equalization grant provides each school district with a minimum tax base per-pupil. The state sets a minimum tax base per pupil. These grants lower the tax price of services.

simulations to obtain a measure of how much the tax price influenced the property tax rate. These simulated results indicate that the STAR program resulted in an increase in the property tax rate of approximately 21.33% for the average county in New York. This result is interesting for this analysis because increasing the rate in response to a tax relief program confounds the goal of lowering the property tax burden.

One empirical challenge that Eom et al. faced was that the estimates of the cost drivers were statistically insignificant in the fixed effects version of their model. Because these cost terms were necessary for the estimation of their demand equation, they re-estimated the model using random effects. While this approach yielded statistically significant estimates for the cost drivers, a Hausman specification test for fixed vs. random effects rejected the random effects model. This indicates that there is a statistically-significant degree of correlation between the jurisdiction-level random effects and the other regressors, potentially leading to inconsistency of the estimates.

In a subsequent paper, Eom and Rubenstein (2006) return to the issue of estimating the effects of the STAR program on school efficiency, but in this paper they employ the data envelopment analysis (DEA) technique to estimate the determinants of school efficiency, rather than the 2SLS panel regression approach used in the earlier paper by Eom, Duncombe and Yinger (2005). This DEA technique allowed them to obtain a direct measure of elasticity and so they did not need to estimate the STAR program's effect on the rate of the tax or on the level of property taxation.

The takeaway from these papers is that there hasn't been a reliable estimate of the tax price elasticity of a state funded homestead exemption in any of the papers evaluating the STAR program.

Tax Rate Analysis

The property tax rate has been another focus in the study of how intergovernmental policies influence local fiscal behavior. One paper of particular interest is Holtz-Eaken and Rosen's (1990) investigation into the mechanism through which local governments respond to the federal income tax deduction for property taxes. Specifically, they ask whether governments respond to deductibility by changing the tax rate. The authors develop a model with two types of actors: voters which maximize utility through consumption of private goods and public services and elected officials which set the property tax rates to maximize their expected votes. Their analysis gives evidence that federal deductions for property tax payments reduce the average tax price and result in increases to the average property tax rate, property tax revenues and local spending on public services. They achieve this result using a model of rate determination in which the property tax rate is a function of the average tax price in the jurisdiction, individual income, population, federal grants and other environmental factors. The tax price parameter controls for the effect of the federal income tax deduction for property taxes. This function is displayed below in equation (2.28).

$$\ln\Theta_{ct} = \beta_0 + \beta_1 \ln P_{ct} + \beta_2 \ln Y_{ct} + \beta_3 \ln G_{ct} + \beta_4 N_{ct} + \sum_j^k \phi_j X_{jct} + f_{ct} + \varepsilon_{ct} \quad (2.28)$$

Where:

Θ is the effective tax rate

P is the tax price

Y is income per capita

G is external government aid

N is population

X is a vector of j environmental controls

c represents communities

t represents time periods

f is a vector of fixed community-specific effects

Holtz-Eaken and Rosen difference (2.28) across time in order to estimate the effect of changes in the tax price variable on changes in the property tax rate. This approach has the benefit of eliminating the community-specific fixed effects. It also focuses the analysis on community-level responses to changes in the tax price rather than cross-sectional differences in price and rate.

The authors obtain an estimate for the price elasticity of -2.67 which they convert to the average change in the millage rate associated with federal deductibility. They do this by taking the mean change in the tax price due to federal deductibility, -7.9%, and multiplying it by their elasticity estimate to obtain the average percent increase in the property tax rate: 21.1%. This translates to a 7.15 mill increase in the average property tax rate associated with the federal deductibility of property taxes.

An earlier analysis of how property tax rates can be affected by intergovernmental fiscal policies is found in Strauss' (1974) study of federal block grants. In that study, Strauss develops a system of equations to model simultaneously the grants' effects on local expenditures and property tax rates. The structural forms of these equations are given in (2.29) and (2.30).

$$E_{ij}^d = \beta_1 + \beta_2 Y_{ij} + \beta_3 P_{ij} + \beta_4 P_{ij} + \beta_5 Trans_{ij} + \beta_6 t_{ij} \quad (2.29)$$

$$t_{ij} W_{ij} = \beta_7 R_{ij} \quad (2.30)$$

Where:

i gives localities
 j gives time periods
 E^d is Expenditure demand
 Y is income
 P is population
 $Trans$ is block grant revenue
 t is the property tax rate
 W is the property tax base

R is total local revenue

Strauss's model does not explicitly reference the political processes that guide public a

llocation decisions. His paper was published just one year after Bergstrom and Goodman's (1973) development of the empirical median voter model. Consequently, the concept of a tax price and an analysis of how block grants affect the demand price of public goods are not expressed in Strauss' equations. The value of the transfers instead appears in the equations directly.

Strauss obtains the reduced form versions of the structural equations and estimates the tax rate model using OLS and the expenditure demand equation using a non-linear Gaussian method. The data used for his analysis consist of a one-year cross-section of Wisconsin counties. His results therefore emphasize inter-jurisdictional differences rather than within district responses to changes in intergovernmental aid. Strauss estimates that a 1-percent increase in the block transfers were associated with a 0.06% to 0.32% increase in the property tax rate and a 0.55% to 0.82% increase in overall local expenditures.

Revenue Structure Effects

In addition to affecting the level and the rate of the property tax, intergovernmental aid programs can also influence the mix of revenue sources in the local fiscal structure. The determinants of local revenue structure have been a topic of public finance research for several years (see for example Hettich and Winer's (1984) application of the political cost model and Sjoquist's (1981) use of the median voter model). While the focus of this study is to determine whether tax relief policies had an

impact on the level of the tax, accounting for changes in the revenue structure becomes a concern if the endogenous relationship between total receipts and tax structure biases measures of the level effect. Unfortunately, there have been no studies to my knowledge that have examined local fiscal behavior using a simultaneous model that captured how both the level and the mix of revenues were affected by state or federal tax policies. Both Sjoquist (1981) and Hettich and Winer (1984) make the simplifying assumption of fixed revenue levels in their studies of revenue structure. Conversely, existing studies of how the level and rate of the property tax are influenced by state and federal policies do not control for revenue mix effects. For example, Eom and Rubenstein's (2006) study of the New York STAR program is based on an explicit assumption of fixed revenue shares.

Gade and Adkins (1990) examines the impact of federal income tax deductibility rules for state revenue structures by employing a system of equations that allow both the level and the mix of revenue to be affected. They apply Hettich and Weiner's (1984) framework by using a political cost model to understand the determinants of the mix of revenues used in state tax structures and a median voter model to determine the level of total state taxation. This framework is implemented in their study by specifying a system of seven equations with six of them each modeling the determinants of the share of state revenue obtained from a given source and the seventh modeling the determinants of total state receipts.

The revenue share equations are derived from a political cost framework in which the local officials seek to minimize the cost of generating revenue. Gade and Adkins predict that tax exportation capacity, vertical fiscal balance and the manufacturing and mining sectors of the economy would be key environmental factors that would impact the

political cost of local revenues. They argued that the share of manufacturing activity and the share of natural resource extraction in the state economy both have a positive relationship to the state's ability to export taxes to non-residents. States with significant tourism industries were also predicted by the authors to have a greater capacity to export sales and excises taxes and would therefore rely on them more heavily.

They test their hypotheses on the impact of federal income tax deductibility by creating tax prices for state income, sales and motor fuels taxes and including these prices in the revenue share equations. These tax prices consist of weights for the state-average marginal federal income tax rate that are based on the ratio of the total state deductions for state-income, sales and motor fuels taxes relative to the ACIR estimates of state-capacity for each of those revenue sources. The authors use these weights as a measure of the relative cost of using each revenue source and should therefore perform in the estimating equations as a measure of the tax price. In addition, each revenue share equation also includes the total per-capita state revenue as an endogenous variable which is intended to capture the effect of the scale of the public sector on the revenue structure.

The seventh equation uses per-capita revenue as the dependent variable and includes the tax shares from the revenue categories as endogenous variables. The authors use median household income and real dollar federal aid per family as instrumental variables to measure the median voter's preferences. Interestingly, they do not include their tax price variables in the second equation for the scale of the public sector. They were therefore unable to comment on the impact of their price terms on the level of state spending. The full system of equations used by Gade and Adkins is displayed below in (2.31) and (2.32).

Revenue Share Equations (2.31)

i=1...50 states

t=1...5 years

$$\begin{aligned} Income_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \\ GenSales_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \\ SelectSales_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \\ MotorFuel_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \\ Licenses_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \\ Other_{it} &= \mu_i + X_S\beta_i + TX\delta_i + \varepsilon_{it} \end{aligned}$$

Each dependent variable is the share of total state revenues derived from that source.

X is a vector of the following:

- manufacturing added value share
- mining added value share
- tax price of state income tax
- tax price of state general sales tax
- tax price of state motor fuels tax
- ratio of state share of national retail sales to state share of national population
- state share of total state and local revenue

TX is total revenue per capita in the state i in year t

Total Revenue Level Equation (2.32)

$$TX_{it} = \mu_{it} + Y_{it}\gamma + INC_{it}\zeta + Z_{it}\eta + e_{it}$$

Where:

Y is a vector of 5 of the 6 revenue shares (Other omitted)

INC = median family income

Z = Real federal aid to state government per family

The authors estimate this system using 3SLS. They obtain statistically significant price elasticities and cross-price elasticities with respect to the set of revenue sources and found results that met their expectations of revenue substitution. They find an own-price elasticity for the share of state income tax funds of -1.131 and cross-price share elasticities with general sales and motor fuels of 0.613 and 0.209, respectively. These

findings depict a pattern of significant revenue substitution of sales taxes in place of state income taxes as a result of federal deductibility.

The empirical approach applied by Gade and Adkins to study state tax structures could be applied to local governments for the purpose of analyzing the impact of state-level policies. At this point, no other author has attempted to perform a simultaneous approach to examining the impact of property tax relief programs on both the level and the mix of local revenues. One issue with that methodology, however, is that the level equation estimates the impact on total local revenues, rather revenues derived from a single source. That distinction makes Gade and Adkins' approach less precise for determining whether tax relief policies had an unintended effect on the level of property taxes.

The Georgia Homeowner's Tax Relief Credit

Georgia adopted The Homeowner's Tax Relief Credit (HTRC) in 1999 as a means of reducing the burden of property taxes on homeowners. At the time, the state government was experiencing a budget surplus due to rising assessed property values and, subsequently, property tax payments. Governor Roy Barnes supported the creation of a state funded homestead exemption to transfer surplus state funds to local governments to offset rising property taxes (Tilley 1999).

The Homeowner's Tax Relief Credit exempts a fixed amount of the assessed value of qualified owner-occupied residential property from local property taxes. Homeowners receive a credit on their property tax bill equal to the property tax rate times the homestead exemption. The size of the homestead exemption is specified annually in the General Appropriations Act for the state budget. At the time of its initial enactment,

the grant provided a tax credit equal to the reduction in taxes from an exemption of \$2,000 for each eligible homestead. The size of the funded exemption has been regularly changed and was set in 2008 at a value of \$8,000 per homestead. In 2009, due a state budget shortfall the grant was eliminated.

Several other features of the way the property tax is administered in Georgia affect the administration of the HTRC. Local governments in Georgia apply a 40% assessment ratio. This makes an \$8,000 property exemption against assessed value equivalent to an exemption of \$20,000 of the property's market value. The credit is non-refundable; that is, the credit cannot exceed the tax liability after all other homestead exemptions have been accounted for.

Table 2.2 History of HTRC Exemptions and Appropriations¹¹

Year	Statutory Exemption Value	State Appropriation for HTRC Grants (in millions)
2007	\$8,000	\$432.3
2006	<i>\$10,000 (\$12,750¹²)</i>	\$567.7
2005	\$10,000	\$432.3
2004	\$10,000	\$380
2003	\$10,000	\$380
2002	\$8,000	\$353
2001	\$6,000	\$249
2000	\$4,000	\$166
1999	\$2,000	\$83

¹¹ See Georgia Law 2000 pp. 323, 1769; Georgia Law 2001 pp. 661; Georgia Law 2002 pp. 709; Georgia Law 2003 pp. 748; Georgia Law 2004 pp. 1028; Georgia Law 2005 pp. 1400; Georgia Law 2006 pp. 145; Georgia Law 2007 HB 95 made an Act pp. 223

¹² Amended. The FY 06 allowable exemption was initially set at \$10,000 and the appropriation was \$432,209,501. It was subsequently amended to provide a one-time increase to the exemption in order to return surplus FY07 funds to taxpayers. See amendment to Appropriations in HB 94. Ga. Law 2007 pp. 119

Table 2.2 presents a history of the allowable exemption amounts and the annual state appropriation for funding the grant. Initially, the grants only funded exemptions for county and school governments, but in 2002 the HTRC was amended to cover municipal property taxes .

The exemption is administered by local governments. The statements mailed to each homeowner indicates the amount of tax savings they receive through the HTRC program. The state provides a grant to each jurisdiction to offset the revenue local governments forgo as a consequence of providing the exemption.

Consider the following example for a homestead with a market value of \$250,000. Because of the 40% assessment ratio, its assessed value would be \$100,000. If in 2008 the home was located in unincorporated Cobb County, Georgia, it was taxed by the county at a rate of 6.82 mills and by the school district at a rate of 18.9 mills. Cobb County provides its own standard exemption of \$10,000 against both county and school district property taxes. This reduces the taxable value to \$90,000. Therefore, the initial combined property tax liability before the HTRC is applied is \$2,314.80. In 2008 the State of Georgia set the allowable HTRC exemption at \$8,000. The homeowner would get credits of \$54.56 for county taxes and \$151.20 for school taxes for a total credit of \$205.76¹³. The credit has the same effect as a \$8,000 homestead exemption, which would reduce the taxable value of the property to \$82,000 and lower the total tax payment to \$2,109.04, a reduction of \$205.76. The HTRC law requires that the state provide a grant to the local government equal to the revenue lost from the credit. If there

¹³ Credit = $(.00682 + .0189) * (\$8,000) = \205.76

were 5,000 properties in that county that received the credit then the grant from the state would be equal to \$1,028,800. This grant would be allocated across the county government and the school district in proportion to their millage rates.

Preliminary Investigation of the HTRC Program

The theoretical models predict that a state-funded homestead exemption will induce substitution effects that increase the property tax rate and the level of property taxation. A graphical examination of trends in average property tax rates and per-capita property tax receipts across Georgia counties suggests that the HTRC may have had such an impact. Figures 2.5 and 2.6 compare the allowable state funded exemption with the aggregate¹⁴ property tax rates in Georgia counties. Figure 2.5 presents the average aggregate county millage rates for all counties from 1990 through 2007. Figure 2.6 breaks the millage rates into quartiles that are recomputed annually. Figure 2.5 shows an overall trend in which average millage rates increased during the early 1990's and then leveled off around the middle of the decade. Then in 2000, a year after the HTRC was first implemented, average rates began to climb again. Figure 2.6 shows the overall pattern of rising average millage rates is present across all millage rate quartiles.

¹⁴ For the purposes of this example, these rates are the combined rates levied by the county governments, the school districts and any special purpose service districts, but exclude municipal tax rates.

Figure 2.5¹⁵

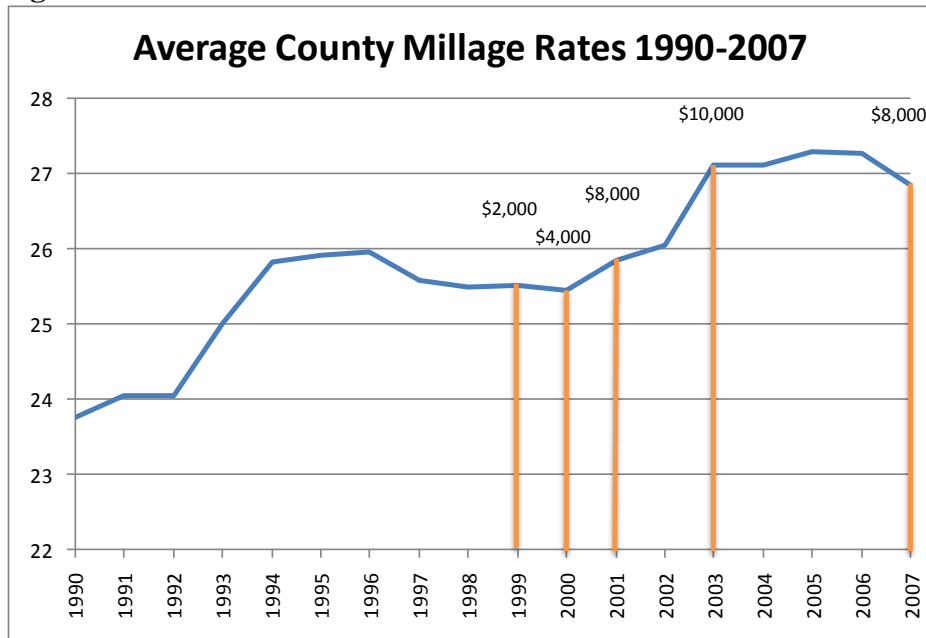
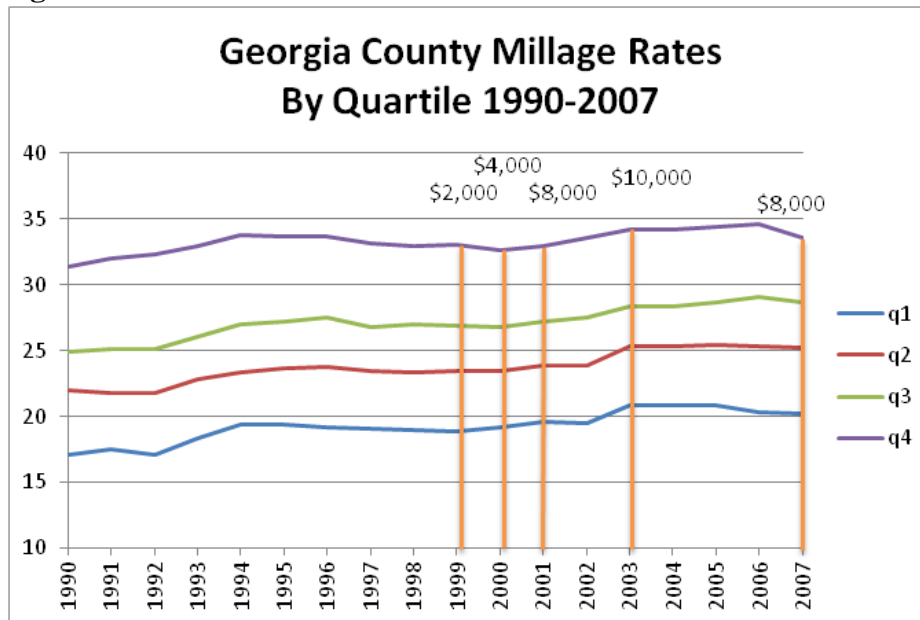


Figure 2.6¹⁶



¹⁵ Source: Georgia Department of Revenue

¹⁶ Ibid.

Figure 2.7 depicts the trend in property tax revenues per capita, net of the HTRC credit, between 1990 and 2007. This figure is based on a subset of 156¹⁷ out of the 159 counties in Georgia. The amounts have been converted to real dollars using the Southern urban consumption CPI from the BLS. This period exhibits an overall upward trend in per capita property taxes, but the rate of growth increases in the years following the introduction of the HTRC. This finding is interesting because, while the predicted effect of a state-funded homestead exemption is upward pressure on the property tax rates, the effect on gross property tax receipts, net of the credit, is ambiguous. The substitution effects should unambiguously raise the combined revenue from the property tax plus the replacement grant, but it would be a sign of a large combined effect for property tax receipts alone to increase as a result of the grant. For property tax revenue alone to rise as a result of the HTRC the effect would have to more than compensate for the property tax revenue lost due to the exemption.

Figure 2.8 shows that the share of total revenues derived from the property tax declined from 1991 through 1998 . This trend appears to halt in 1999 and from that point the property tax share even exhibits some slight gains. This is consistent with the prediction made by the graphical analysis shown in Figure 2.4 and its corresponding discussion. The property tax revenue share would be expected to increase following the implementation of the grant program.

¹⁷ The consolidated city-county governments of Clarke/Athens, Richmond/Augusta and Cussetta/Chattahoochee were not included in this table due to limited availability of their property tax data.

Figure 2.7¹⁸

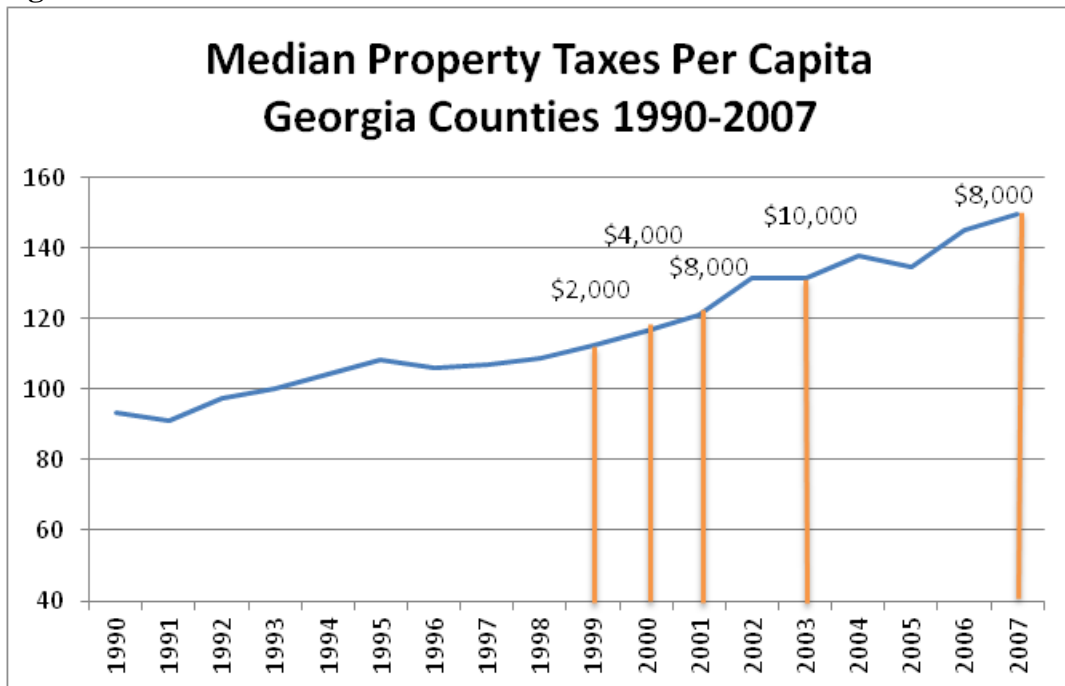
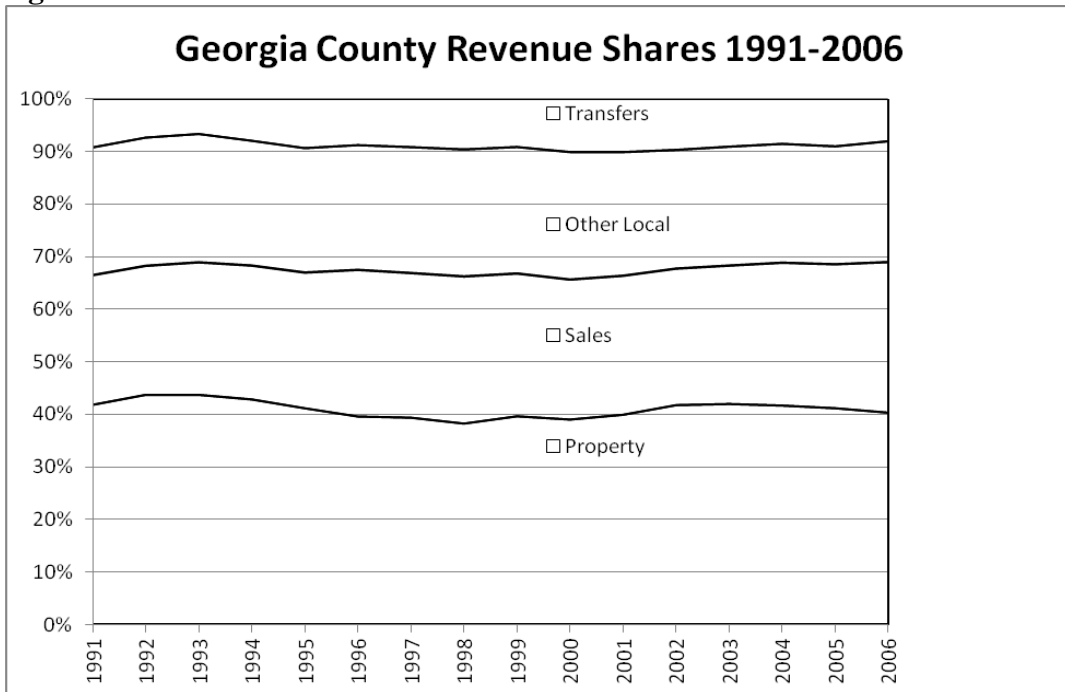


Figure 2.8.¹⁹



¹⁸ Georgia Department of Community Affairs. Report on Local Government Finance

¹⁹ Ibid.

The graphical analyses suggest that the HTRC may have increased both property taxes and millage rates . the share of revenue derived from the property tax rose modestly when the HTRC was implemented. This initial look at the data, however, does not control for other factors that could also influence revenue patterns over this period. The preliminary evidence warrants further investigation with more sophisticated models and methods.

Empirical Strategies

My research objective is to evaluate degree of tax relief provided by a state-funded homestead exemption. If the sum of property tax revenue and the replacement grant is greater than the level of property tax revenue that would be collected if the grant did not exist then that is evidence that some of the grant is being used to increase local spending. Another indication that the HTRC is increasing local revenue is local officials respond to it by increasing their property tax rates. I confine this empirical exercise to testing for an impact on the level of property revenues and on the property tax rate. I do not consider the possible effect on non-property tax revenue.

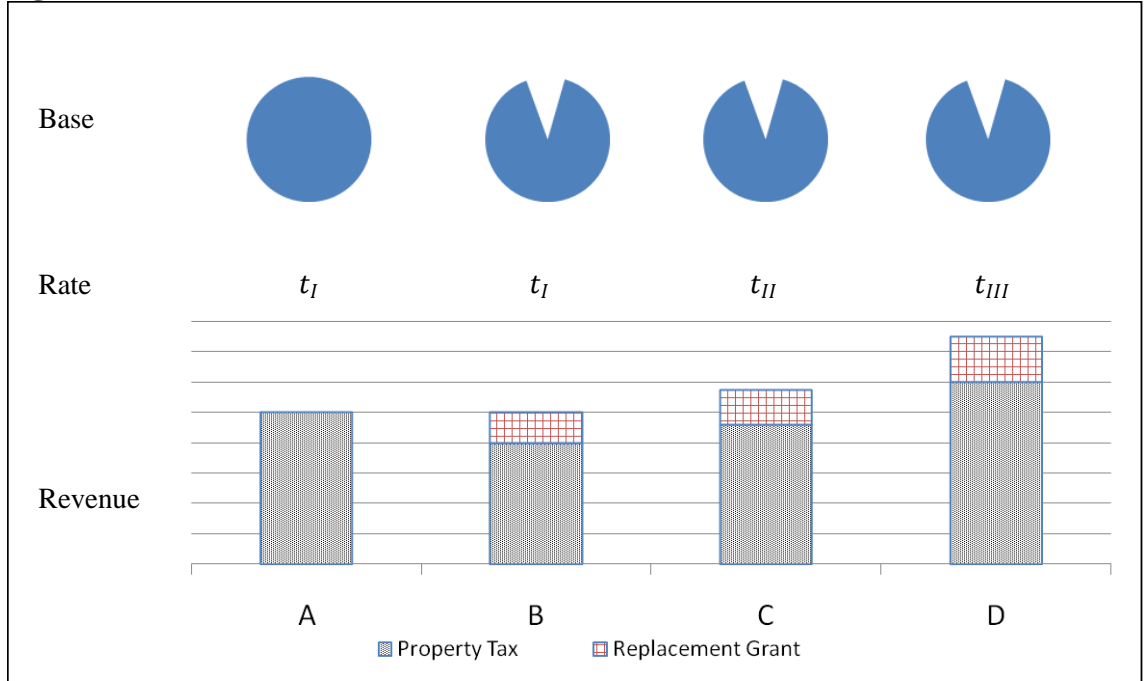
One of the challenges of evaluating the effect of a state-funded homestead exemption is the difficulty in using tax price elasticity estimates to assess the effect of the grant on the level of property taxes. If property taxes are determined by the median voter and voter behavior is based on the tax price given by $\frac{(v_i - E)}{v}$, then the coefficient on the tax price can be used to measure the effect of the HTRC program on property taxes. However, our supposition is that the effect of the HTRC program on property taxes may not conform to the theory as described.

The grant affects property tax receipts in two ways: by changing the median voter's tax price, and thus inducing a price substitution effect, and by shrinking the taxable base through the exemption. Observe Figure 2.9 in which I depict three potential outcomes of a state-funded homestead exemption. The top row contains pie charts which illustrate the taxable share of the property tax base, the middle row indicates the tax rate and the third row depicts the combined revenue from the property tax and the replacement grant. The first column, A, depicts the pre-exemption situation in which the entire property base is taxed at an initial rate denoted as t_I . Column B depicts the politically intended outcome from the exemption in which the rate remains at t_I and total revenue remains constant, with the funds from the grant merely replacing a share of the local revenue. Total combined revenue from the tax and the replacement grant remains equal to the initial property levy depicted in Column A. The bar graph in the 3rd row of Column B shows that the property tax exemption reduces the property tax dollar for dollar of the grant. In this case, the tax price elasticity with respect to the property tax grant program would be zero.

Column C depicts a degree of price substitution, but the increase in the tax rate from t_I to t_{II} is small enough that the locally-obtained property tax revenue remains less than the original level depicted in A. Combined revenue from the tax and the replacement grant does, however, exceed the initial level of revenue in Columns A and B. The tax price-revenue elasticity would also be positive in this case, the substitution effect being overwhelmed by the revenue loss from the exemption. Only in Column D, in which the tax rate, t_{III} , becomes high enough to make the level of property tax revenues derived from the smaller base exceed even the initial property tax levy, would the

exemption price-revenue elasticity be expected to show the negative sign that is consistent with predictions from the median voter model of tax demand.

Figure 2.9. Mechanics of the Homeowner's Tax Relief Credit



This line of argument suggests two alternative empirical approaches. The first would be to use the sum of property tax receipts and the replacement grant as the dependent variable and estimate the combined revenue-price elasticity. The second would be to use the tax rate as the dependent variable in order to measure the change in the rate in response to changes in the tax price. I shall employ both approaches. They are developed in the remainder of this section.

Approach I: Sum of Property Taxes and Replacement Grant Per Capita

My first empirical approach employs the sum of property taxes and the replacement grant revenue as the dependent variable. I estimate several variants of different models with this structure in order to explore the sensitivity of my findings to

the model design. I begin with an estimation strategy similar to that taken by Fisher (1988), but with some adjustments to reflect the longer time period spanned by my data.

Following Fisher, I model the demand for local revenue as a function of personal income, the local tax price and other environmental taste parameters. The demand for property tax revenue is derived from the public's demand for public and private goods, depicted in (1), and is expressed as equation (2.33). The null hypothesis for this analysis is that local governments do not change their fiscal behavior in response to the tax relief program. That is the outcome described by Column B in Figure 8 in which the tax rate remains at t_1 and total revenues remain at the pre-exemption level. If that were the case then the exemption tax price would not have a significant association with the dependent variable because the replacement grant is merely replacing property tax receipts without a net impact on total revenue. On the other hand, if there is a tax price substitution effect that foils the revenue-neutral intent of the policy, then it would be expected that the exemption price elasticity with respect to the sum of property tax revenue and the replacement grant would be negative. However, the coefficient on tax price could be negative because of variation in $\frac{(v_i)}{V}$ and have the same value if tax price is measured as $\frac{(v_i - E)}{V}$.

Expressing the demand for combined property and replacement grant revenue as a log-linear relationship yields equation (2.33).

$$T_{it} = \alpha_i + \beta_1 Y_{it} + \beta_2 P_{it} + \sum_j \beta_j Z_{jit} + \varepsilon_{it} \quad (2.33)$$

Where

T_{it} = log of the sum of property tax and replacement grant revenue per capita for county i in year t

Y_{it} = log of per capita personal income for county i in year t

P_{it} = log of tax price in county i in year t

Z_{jt} = set of j taste and cost factors for county i in year t

ε_{it} = an error term more clearly defined as:

$$\varepsilon_{it} = \epsilon_{it} + \tau_i$$

I operationalize the tax price using the perfect-information median voter approach discussed in the previous sections. I test three different versions of the tax price (P_{it}) and compare their impacts on combined revenues per capita.

In the first version I use the general tax price with no control for the state-funded homestead exemption, following the structure given in equation (2.5):

$$p_{it}^G = \frac{v_{it}}{V_{it}} \quad (2.34)$$

Where:

p_{it}^G is the General Tax Share

v_{it} is the value of the median value home for county i in year t

V_{it} is the total assessed property value for county in year t

In the second specification I introduce the effect of the homestead exemption using the same tax price form given in equation (2.9). This specification uses one price variable that combines the effect of the HTRC exemption and other changes to the tax price driven by economic conditions.

$$\widehat{p}_{it}^{GE} = \frac{v_{it} - E_t}{V_{it}} \quad (2.35)$$

Where:

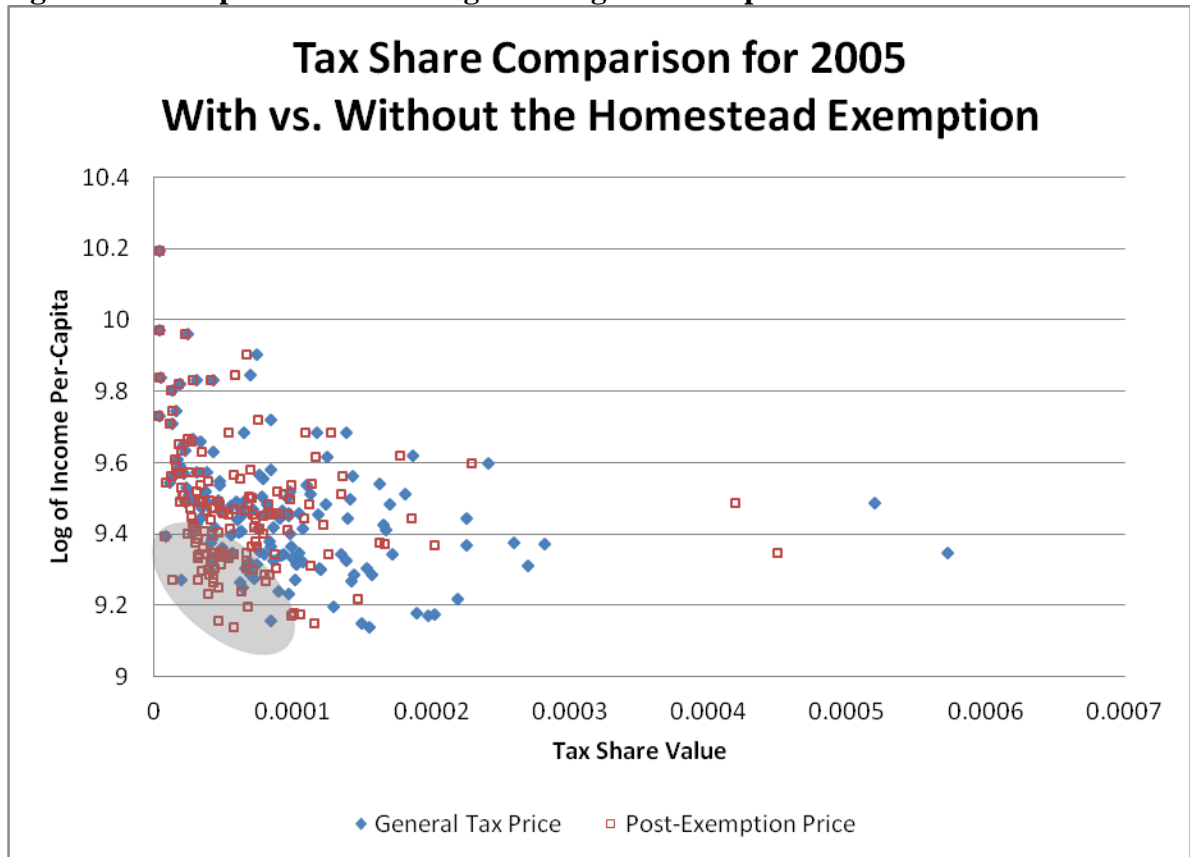
\widehat{p}_{it}^{GE} is the Post-Exemption Tax Share

E_t is the allowable state-funded exemption per household in year t

Because the value of the allowable exemption changes several times over the period of analysis, the value of the tax price varies both within cross-sections across counties and within individual counties over time. To illustrate the impact of the exemption on the tax price, Figure 2.10 compares the general tax share with the post-exemption tax share for

the year 2005. These tax shares are graphed against the log of county income per capita. In this year the size of the state-funded homestead exemption was \$10,000. In this figure I observe that the effect of the exemption was to generally reduce the tax share, with the largest changes in tax price occurring among the lowest income counties.

Figure 2.10 Graph of Tax Share against Log of Per Capita Income



The third specification includes two measures of the tax price so that the effect of the homestead exemption on combined revenues is estimated separately from the effect of other economic factors which would alter the tax price. The new measure of the HTRC program's effect, rather than being structured as a tax price, is the percent change in the median voter's tax share caused by the homestead exemption. This term is structured by taking the ratio of the median voter's allowable exemption (which is the

same amount for all taxpayers in year t) with the tax base and dividing that by the median voter's tax share.

$$\% \Delta p_{it} = \frac{\left(\frac{v_{it} - E_t}{V_{it}} - \frac{v_{it}}{V_{it}} \right)}{\frac{v_{it}}{V_{it}}} = \frac{E_t}{v_{it}} \quad (2.36)$$

The coefficient on this term should measure the effect of a percent reduction in the median voter's tax share due to the homestead exemption on dependent variable.

I test several specifications of (2.33) in order to compare their goodness-of-fit to the data. These specifications vary in form that P takes and the approaches used to control for confounding factors. Using multiple approaches to testing the model reveals how sensitive the results are to the features of a given specification. I conduct the first set of estimates of (2.34) using a fixed-effect panel regression model and with county-level clustered standard errors. I test this model using each of the three price structures separately.

For my second set of specifications I difference equation (2.34) over time by one year. This approach highlights the effect of within-county changes in the tax price on changes in combined property-tax and replacement grant revenue. The structure of these specifications is shown by equation (2.37). I test each of the three price variable structures using this differenced approach. I estimate these equations using clustered-standard errors regression.

$$\Delta T_{it} = a_i \Delta \beta_1 Y_{it} + \beta_2 \Delta P_{it} + \sum_j \beta_j \Delta Z_{jit} + \Delta \varepsilon_{it} \quad (2.37)$$

The third approach that I take abandons the tax price variables and replaces them with the actual replacement grant revenue received through the HTRC program on a per-

capita basis. This approach tests for a significant relationship between a dollar of grant revenue per-capita and a dollar of combined property tax and replacement grant revenue. If, as the null hypothesis maintains, there is no price effect then the replacement grant revenue would replace property tax receipts on a dollar-per-dollar basis and there should not be a significant relationship between grant receipts and combined revenue. On the other hand, a positive significant relationship between the two would be consistent with a price effect.

Unfortunately, using the revenue from the grant as an explanatory variable is problematic because it is endogenous with the dependent variable. Both the level of revenue from the property tax and the size of the replacement grant are determined in part by the jurisdiction's property tax rate. The simultaneous determination of the two variables would cause the value of the grant to be correlated with the error term in the estimating equation. Because of this relationship between the two variables I present an additional model which instruments for the amount of the grant by replacing it with what the grant would have been if the prior year's millage rate had been maintained at the same level. This gives a measure of what the grant would have been if the rate were not changed in response to the current year's homestead exemption.

The next set of equations combines the second and third approaches by using the instrument for the size of the grant in a differenced model design. This model highlights how changes in the level of the predicted grant are associated with changes in combined property tax and replacement grant revenue.

The final set of equations abandons the median voter approach and examines how the HTRC program changes the total taxable value in the jurisdiction. Instead of the

median voter's tax price, this set of equations uses the ratio of the net taxable property base to the gross property tax base, depicted in equation (2.38). Although this empirical approach lacks the theoretical connection between the median voter's preferences and the public choice mechanism, it reflects the magnitude of the overall exemption relative to the tax base.

$$\widehat{p}_{it}^A = \frac{V_{it} - nE_t}{V_{it}} \quad (2.38)$$

Approach II: Property Tax Rate

The second approach I take to measure the impact of the state-funded exemption uses the millage rate as the dependent variable. Following the approach used by Holtz-Eaken and Rosen (1990), this strategy will seek to measure the substitution effect directly on the chief policy instrument that local officials use to control the size of the property levy²⁰. An increase in the property tax rate in response to the exemption would be the predicted local response if the replacement grant is used to raise local expenditures as opposed to reducing the property tax burden. This strategy shares with Approach I the strength that measurements of changes to the rate in response to the exemption would not be confounded by reductions to the tax base. Referring back to Figure 8, the tax price coefficient for the millage rate regressions would be expected to be statistically insignificant if Column B were the case and negative for the cases of C and D. Similarly,

²⁰ There is the potential for officials to change assessment practices to capture the grant, but because the level of the exemption was changed on almost an annual basis over this period it is unlikely that local officials would have employed that strategy.

the expected coefficient of the $\% \Delta p_{it}$ variable would be positive if there is a significant substitution effect.

I follow Holtz-Eaken and Rosen's (1990) empirical approach in which the tax rate is a function of personal income, the tax price, population, other intergovernmental aid and other environmental controls. I also difference the data across time in order to eliminate the effect of fixed county-level factors that would influence the rate and to focus the analysis on the determinants of changes in the millage rate over time. The equation for the tax rate in levels is given in (2.39) and the differenced model that will be estimated is given in (2.40). I employ the same structures for the tax price as I presented for Approach I.

$$R_{it} = \alpha_i + \beta_1 Y_{it} + \beta_2 P_{it} + \sum_j \beta_j Z_{jit} + \varepsilon_{it} \quad (2.39)$$

Where

R_{it} = log of the property tax millage rate for county i in year t

Y_{it} = log of per capita personal income for county i in year t

P_{it} = log of tax price in county i in year t

Z_{jit} = set of j taste and cost factors for county i in year t

ε_t = the error term in year t

and $\varepsilon_{it} = \epsilon_{it} + \tau_i$

$$\Delta R_{it} = \beta_1 \Delta Y_{it} + \beta_2 \Delta P_{it} + \sum_j \beta_j \Delta Z_{jit} + \Delta \epsilon_{it} \quad (2.40)$$

I estimate equation (2.40) using a clustered standard error panel regression model.

Data

I perform this analysis using data on Georgia county governments. All data used are taken at the county level. The property tax revenue data for the dependent variables come from the *Report on Local Government Finances* collected by the Georgia Department of Community Affairs. This is an annual report completed by local governments in Georgia that collects detailed information on revenues and expenditure

data. I also rely on tax digest data collected from the Georgia Department of Revenue. Economic indicators on the components of the local economy come from the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics. County level personal income comes from the Bureau of Economic Accounts Local Area Personal Income tables. Of the 159 counties in Georgia, I possess complete data for 137 counties over the 12-year period of 1996 to 2007 and adequate partial data for another 21 counties. The one county I have excluded is the consolidated city-county government of Cusseta-Chattahoochee which did not participate in the RLGF survey until 2004.

I follow the standard assumption that the median voter in a given locality also owns the median value home. By using the median home value in the various tax price equations I have presented, my estimates represent the median voter's tax price. Median home value at the county level is not readily available except for the decennial census year. I approximate median home values for the rest of my panel by weighting the 2000 median home value from the US Census by annual growth in the residential tax base, per capita. This value is used as the v_{it} term in each of the tax price specifications.

I use several measures of the environmental and demographic characteristics that control for other determinants of the indirect demand for property taxes. I include population density as a measure of demand under the expectation that more concentrated populations will have a higher per-capita demand for public services. Population is also included in the equation as a control for scale effects on cost of public services. I also control for the share of county wages derived from agriculture and from the service sector in order to measure any impact that the local economy would have on fiscal structure. To control for other county-level features of the tax structure on the level of property tax I

include measures of transfer revenue from the state and national government and the value of other property tax exemptions provided by the state and local government. I also include the aggregate rate for the county sales tax. This rate is the sum of all local-option type sales taxes that voters in the county have approved at that time. Counties adding local option sales taxes in Georgia for certain purposes have been required to offset the additional sales tax revenue with reductions in property tax levies. Measuring the aggregate sales tax rate is a means of controlling for this behavior. I also include the share of the property tax base that consists of residential property. Summary statistics for the variables included in the models are displayed in Table 2.3. The first-difference forms of the same variables are displayed in Table 2.4.

The difference in logs over time can be interpreted as the average annual growth rate across counties. The figures given in Table 4 indicate that from 1996 through 2007 county property tax millage rates increased at an average rate of 1.3% per year, while median tax shares declined on average by 1.9% annually. The standard deviations of the growth rates, however, are larger than the means, indicating that the high degree of variability across counties and across time in the changes in these variables. Another feature of the data revealed in the summary tables is the significantly greater degree of variation in the tax share after the effect of the exemption has been taken into effect. The naïve tax share exhibits a mean annual reduction of 1.9%, while taking the tax share into account yields a tax share declines on average by 4% annually. This effect is even more pronounced when looking at some of the lowest property value counties rather than at the central tendency of the sample. In 2006, the median home value at market price for Calhoun County, after converting to real 1983-1984 dollars was \$24,448.67. After

applying the 40% assessment ratio, this becomes \$9,779.47. The value of the HTRC exemption in that year, converted to real dollars is \$6,548.54. The exemption therefore

Table 2.3 Summary Statistics for Level Variables

	Mean	Std Dev
Log of Property Tax and Replacement Grant Revenue Per Capita	4.873	0.379
Log of tax share	-9.699	1.023
Post-Exemption Tax Share	-9.891	1.002
Percent Reduction in Tax Share Due to Exemption	16.326	13.516
Log of Median Home Value	9.892	0.363
Log of Income Per Capita	9.441	0.175
Log of Population	10.092	1.124
Density - 100 people per Square Mile	1.712	3.486
Aggregate Sales Tax Rate	6.636	0.554
Log of Other Transfer Revenue Per Capita	3.202	0.759
Service Sector Share of Local Wages	0.414	0.14
Agriculture Sector Share of Local Wages	0.021	0.055
Residential Share of Property Tax Base	0.346	0.135
Number of Records	1,859	

Table 2.4 Summary Statistics for Differenced Values

	Mean	Std Dev
Change in Log of Property Tax and Replacement Grant Revenue Per Capita	0.035	0.163
Change in Log of Millage Rate	0.013	0.159
Change in Log of Tax Share	-0.019	0.061
Change in Log of Post-Exemption Tax Share	-0.040	0.106
Change in Percent Reduction in Tax Share Due to Exemption	1.811	6.178
Change in Log of Median Home Value	0.029	0.097
Change In Log of Income Per Capita	0.007	0.026
Change in Log of Population	0.015	0.019
Change in Population Density: 100 per square mile	0.037	0.094
Change in Aggregate Sales Tax Rate	0.101	0.347
Change in Log of Transfer Revenue Per Capita	0.020	0.653
Change in Service Sector Share of Local Wages	0.004	0.029
Change in Agricultural Sector Share of Local Wages	0.000	0.015
Change in Residential Share of Property Tax Base	0.006	0.024
Number of Records	1693	

reduces the taxable value of the median property valued parcel in that county by nearly 70%. In that year the tax share, without accounting for the exemption, declined by 3.3%, while the post-exemption tax share declined by 41%. The magnitude of the change in the tax price suggests that there may be a non-linear relationship between the exemption and the level of revenue. I address this by testing a model in which the percent reduction in the tax share due to the exemption ($\% \Delta p_{it}$) is paired with a squared term.

Results

Approach I: Property Taxes and Replacement Grant Revenues Per Capita

I use the sum of property tax receipts and replacement grant revenue per capita as the dependent variable in several different estimating equations. The first set of estimates comes from a fixed-effects panel regression model using standard errors that are clustered at the county level. I display two sets of equations in Table 5 which are identical in structure except that the second set includes county-level median home value as an additional control for the effect of wealth on revenues. Columns 1 and 4 of Table 2.5 depict a naïve model which measures the effect of the homeowner's tax share, p_{it}^G , without controlling for the HTRC program. Columns 2 and 5 use the \widehat{p}_{it}^{GE} measure of the tax price which reflects the tax share after the exemption has been taken into account. Columns 3 and 6 separate the exemption's effect on the tax share from other factors that influence the share by including both p_{it}^G and the percent change in the share caused by the exemption, $\% \Delta p_{it}$.

The coefficient of p_{it}^G can be interpreted as the general tax-price revenue elasticity. The estimates of this elasticity found in Columns 1 and 3 range between -0.263 and -

0.295, but they are not statistically significant. The elasticity estimates in Columns 4 and 6 range between -0.375 and -0.474 and are both statistically significant. These results can be interpreted to indicate that, *ceteris paribus*, a one percent reduction in the tax share for reasons other than the state-funded exemption would yield an increase in combined property tax and replacement grant revenue somewhere between 0.38% and 0.47%. These estimates are similar to Bergstrom, Rubinfeld and Shapiro's (1982) estimates of price elasticities for local school expenditures which ranged from -.43 to -.57, and also fall within the range of the several single-state estimates performed by Bergstrom and Goodman (1973) for general municipal expenditures.

Columns 2 and 5 display the elasticity estimates of the post-exemption tax price, \widehat{p}_{it}^{GE} , and combined revenues. Both estimates are statistically significant and their values alternate between -0.128 without the control for median home value and -0.222 with it.

Comparing the tax price estimates of Columns 1 and 2 is difficult because the naïve model's coefficient is not statistically significant. Both elasticities are significant in Columns 4 and 5 and comparing the two point estimates indicates that controlling for the exemption's effect reduces the tax price elasticity. The 95% confidence intervals, however, reveal that the difference between the two variables is not statistically significant.

Columns 3 and 6 separate the post-exemption tax price into two components, the median homeowner's tax share before the exemption and the percent change in the tax price due to the HTRC program. The measure of the exemption's effect is significant in both equations and the value of its coefficient alternates between -0.133 without the median home value control and -0.253 with it. This indicates that a 10% reduction in tax

share due to the HTRC program is associated with an increase in aggregate property tax and replacement grant revenue per capita somewhere between 1.3 and 2.5%. This finding is evidence that there is significant ‘capture’ of the tax relief grant by local governments. If the program were ‘revenue neutral’ as the program was advertised then there should have been no statistically significant effect.

Several other parameter estimates are interesting. Coefficients for the log of median home value in Columns 4-6 range from 0.180 to 0.235. This indicates that, controlling for all other factors, a 10% increase in median home value would be associated with approximately a 2% increase in combined property tax and replacement grant revenue per capita. Surprisingly, the income per-capita term was not statistically significant in these and several other specifications that I examined. Median home value is likely capturing the level of wealth in the county, which may have a stronger tie to fiscal behavior than income. Income per capita fails to achieve significance even when the median home value term is dropped.

The population density term is significant in all four equations and ranges from -0.052 to -0.064. This term is the raw value rather than the natural log so the coefficient must also be multiplied by 100 to interpret it in terms of percent changes. The estimate indicates that an additional one hundred people per square mile is associated with approximately a 6% reduction in property-based revenue per capita, *ceteris paribus*. This appears to indicate that the dense urban areas of the Atlanta metropolitan region are able to rely more heavily on alternative revenue sources, while the lower-income agricultural counties have a higher level of property taxation.

Table 2.5 Fixed Effects Regression with Clustered Standard Errors

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Dependent Variable: Aggregate Revenue per capita	Naïve	Combined Post-Exemption Price	Separated Price Variables	Naïve	Combined Post-Exemption Price	Separated Price Variables
Log of Pre-Exemption Tax Share	-0.263		-0.295	-0.375**		-0.474**
	(-1.441)		(-1.611)	(-1.986)		(-2.503)
Log of Post-Exemption Tax Share		-0.128**			-0.222*	
		(-2.171)			(-3.313)	
Percent Change in Tax Share From Exemption^			-0.133+			-0.253*
			(-1.936)			(-3.503)
Log of Median Home Value				0.180*	0.205*	0.241*
				(3.233)	(4.134)	(4.191)
Log of Income Per Capita	0.107	0.143	0.116	-0.016	0.026	-0.040
	(0.836)	(1.104)	(0.890)	(-0.123)	(0.197)	(-0.300)
Log of Population	-0.041	0.142	-0.032	-0.224	0.007	-0.269
	(-0.214)	(1.225)	(-0.169)	(-1.077)	(0.056)	(-1.321)
Population density (100/sqmi)	-0.067*	-0.060*	-0.066*	-0.064*	-0.052*	-0.060*
	(-3.825)	(-3.513)	(-3.754)	(-3.659)	(-3.029)	(-3.449)
Aggregate Sales Tax Rate	-0.011	-0.020	-0.015	-0.008	-0.022+	-0.015
	(-0.865)	(-1.557)	(-1.170)	(-0.617)	(-1.664)	(-1.151)
Log of Other Transfer revenue Per Capita	-0.007	-0.007	-0.007	-0.007	-0.007	-0.006
	(-0.816)	(-0.812)	(-0.755)	(-0.867)	(-0.833)	(-0.761)
Service Sector Share of Local Wages	-0.047	-0.056	-0.055	-0.064	-0.082	-0.085
	(-0.336)	(-0.393)	(-0.396)	(-0.457)	(-0.587)	(-0.618)
Agricultural Sector Share of Local Wages	0.350	0.270	0.304	0.418	0.297	0.354
	(1.068)	(0.815)	(0.907)	(1.294)	(0.905)	(1.063)
Residential Share of Tax Base	0.383	0.171	0.493	0.353	0.113	0.553
	(0.948)	(0.779)	(1.205)	(0.945)	(0.516)	(1.431)
Time Trend	0.035*	0.032*	0.030*	0.031*	0.024*	0.020*
	(7.889)	(7.749)	(6.426)	(6.415)	(5.092)	(3.653)
Constant	1.594	0.839	1.113	1.743	0.439	0.875
	(1.044)	(0.533)	(0.712)	(1.184)	(0.287)	(0.580)
Observations	1,859	1,859	1,859	1,859	1,859	1,859
R-squared	0.475	0.474	0.477	0.483	0.483	0.489
Number of id	158	158	158	158	158	158
Robust t-statistics in parentheses						
* p<0.01, ** p<0.05, + p<0.1						
County-Level Fixed Effects Included in all equations						
Residual Sum of Squares	35.57	35.668	35.447	35.077	35.081	34.662
^Already scaled by 100 to convert to elasticity						

The only other term that is statistically significant is the time trend, which enters into all six equations. Its estimates range from 0.02 to 0.034. Holding all else constant, combined property tax and replacement grant revenues per capita were increasing at a rate of approximately 2 to 3 percent annually.

I also test whether adding the control for the HTRC program improves the fit of the model to the data. I perform a set of goodness-of-fit tests in order to measure whether controlling for the state-funded homestead exemption significantly improves the fit of the model. The key determinant in selecting which goodness-of-fit test to use is whether the initial model is nested within the alternative models. If it can be shown that the models are nested then traditional hypothesis testing methods can be used; otherwise more advanced econometric techniques are necessary (Cameron and Trivedi 2005). The following discussion shows that the models are in fact nested and that a standard F-test can be used to test the goodness of fit.

Although it is apparent that the equation of Column 1 of Table 2.5 is nested within the equations for Column 3, it is not obvious whether Column 1 is nested within Column 2. The key issue is that the price variable in Column 1, p_{it}^G , is replaced by the post-exemption tax price, $\widehat{p_{it}^{GE}}$. A simple algebraic transformation of $\widehat{p_{it}^{GE}}$ shows, however, that in this log-linear model the equations are nested.

$$\begin{aligned}
 \widehat{p_{it}^{GE}} &= (v_{it} - E_t)/V_{it} \\
 &= v_{it} \left(1 - E_t/v_{it} \right) / V_{it} \\
 &= \frac{v_{it}}{V_{it}} \left(1 - E_t/v_{it} \right)
 \end{aligned} \tag{2.41}$$

Equation (41) shows that the post-exemption tax price is equal to the product of the initial homeowner's tax share, $p_{it}^G = \frac{v_{it}}{V_{it}}$, and the term $\left(1 - E_t/v_{it}\right)$. This latter portion of (2.41) is reduction in the homeowner's tax share caused by the state-funded homestead exemption. Eom and Rubenstein (2006) perform this same transformation in their analysis of the New York STAR program, another example of a state-funded homestead exemption. Another feature of Equation (2.41) is that it highlights the relationship between Column 2 and Column 3 in Table 5. The enclosed term in (2.41) is simply one minus the tax price variable used in Column 3 $\left(\% \Delta p_{it} = E_t/v_{it}\right)$. Although there is a difference in the arrangement of the terms, the same information is present in both equations.

Because the equations are nested a simple F-test for goodness-of-fit is appropriate for comparing the models. Unfortunately, the Residual Sum of Squares in Column 2 is larger than the RSS from Column 1, suggesting that the post-exemption tax price may actually worsen the fit to the data. One possible explanation for this outcome is that the HTRC program causes much greater changes in the tax share than other economic determinants of tax price and that there are different price responses to the different factors. Using one variable to measure both factors may cause a loss of information.

I find more supportive results when I separate the HTRC's effect from the tax share. An F-test comparing Columns 1 and 3 indicates that Column 3 yields a significantly better fit to the data than the naïve model. Similarly, Column 6 is a significant improvement over Column 4. I also perform a test comparing Columns 3 and 6 to test for the improvement to the fit generated by the median home value parameter.

This test indicates that the 6 is a better fit than 3. The results of these tests are displayed in Table 6.

Table 7 shows the second set of estimates which are obtained from differenced model displayed in equation (2.37). The estimates from this set of equations were obtained using OLS with clustered standard errors. The difference-over-time estimates fail to provide any additional evidence that the HTRC program is associated with a price effect that increases the total level of revenues. The only variable that is statistically significant in any of the equations is the population density term. Also the F-test for joint significance of all the coefficients fails to reject the null hypothesis that any of the estimates are significantly different from zero.

Table 2.6. Goodness of Fit Tests

	Test1: Column 1 vs. Column 3			
A	RSS1-RSS3	0.123		F-statistic
B	# of parameters	1		(A/B)/(C/D)
C	RSS3	35.45		5.87
D	1859-(11+157)	1691		
	Test2: Column 4 vs. Column 6			
A	RSS4-RSS6	0.415		F-statistic
B	# of parameters	1		(A/B)/(C/D)
C	RSS3	34.66		20.23
D	1859-(12+157)	1690		
	Test3: Column 3 vs. Column 6			
A	RSS3-RSS6	0.785		F-statistic
B	# of parameters	1		(A/B)/(C/D)
C	RSS3	34.66		38.27
D	1859-(12+157)	1690		

The next set of estimates use the revenue derived from the replacement grant to control for the HTRC program's effect on the dependent variable. Table 2.8 provides the outcomes of these estimates. No naïve-model estimates are included in this table because

they would be identical to Columns 1 and 4 of Table 2.5. Column 1 of Table 2.8 uses the actual revenue from the replacement grant as a control for the HTRC program, while the Column 2 uses a counterfactual level of grant revenue that is calculated using the HTRC exemption from year t , but the millage rate from year $t - 1$.

The estimates in Columns 1 and 2 of Table 2.8 are very similar to each other. The coefficient on the general tax share in both cases is approximately -0.36. This elasticity estimate is within the ranges of the price elasticity estimates found in Table 5. The coefficients on the population density and the time trend variables are of similar magnitude and statistical significance to the previous models' estimates. The replacement grant revenue variables are statistically significant in both Columns 1 and 2. The coefficient on the revenue coefficient from Column 1 is interpreted to indicate that a one percent increase in replacement grant revenue per capita is associated with a 0.056 percent increase in combined property tax and replacement grant revenue. Similarly, the counterfactual revenue coefficient indicates that a one percent increase in grant revenue is accompanied by a 0.062 percent increase in combined revenue. These values can be put into greater context by considering the share of combined revenue obtained from the replacement grant. Across all counties in the dataset, the mean proportion ranged from 1.9% in the first year the program, when the exemption was set at \$2,000, to 6.8% of revenues in 2003, when the exemption was raised to its all-time high of \$10,000. If the elasticity between the replacement grant revenue and combined revenues approaches the average proportion of revenues derived from the replacement grant then it suggests that on average, the level of combined revenues are increasing by nearly the entire amount of the replacement grant.

Table2. 7 Difference Form Equations

	Naive	Combined Post- Exemption Price	Separated Price Variables	Naive	Combined Post- Exemption Price	Separated Price Variables
Change in Log of Pre-Exemption Tax Share	-0.018		-0.025	-0.000		-0.029
	(-0.231)		(-0.330)	(-0.001)		(-0.318)
Change in Log of Post-Exemption Tax Share		-0.043			-0.043	
		(-0.826)			(-0.682)	
Change in Log of Percent Change in Tax Share from Exemption			0.001			0.001
			(1.296)			(1.180)
Change in Log of Income Per Capita	-0.219	-0.210	-0.209	-0.216	-0.210	-0.210
	(-1.411)	(-1.354)	(-1.350)	(-1.391)	(-1.356)	(-1.354)
Change in Log of Population	-0.040	-0.054	-0.036	-0.024	-0.054	-0.039
	(-0.202)	(-0.270)	(-0.179)	(-0.109)	(-0.260)	(-0.179)
Change in Population Density	-0.061*	-0.061*	-0.059**	-0.061*	-0.061*	-0.059**
	(-2.687)	(-2.722)	(-2.586)	(-2.690)	(-2.694)	(-2.594)
Change in Sales Tax Rate	-0.008	-0.009	-0.009	-0.008	-0.009	-0.009
	(-0.950)	(-0.982)	(-1.000)	(-0.945)	(-0.986)	(-1.004)
Change in Transfers Per Capita	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
	(-0.775)	(-0.740)	(-0.728)	(-0.775)	(-0.739)	(-0.725)
Change in Service Sector Share of Local Wages	0.008	0.004	-0.001	0.009	0.004	-0.001
	(0.058)	(0.028)	(-0.006)	(0.060)	(0.028)	(-0.008)
Change in Agricultural Share of Local Wages	0.001	-0.007	-0.009	-0.000	-0.007	-0.009
	(0.005)	(-0.031)	(-0.043)	(-0.000)	(-0.031)	(-0.043)
Change in Residential Share of the Tax Base	0.194	0.227	0.201	0.177	0.227	0.204
	(1.211)	(1.603)	(1.286)	(1.103)	(1.586)	(1.241)
Change in the Log of the Median Home Value				-0.019	0.000	0.003
				(-0.467)	(0.007)	(0.073)
Constant	0.039*	0.038*	0.037*	0.040*	0.038*	0.037*
	(11.608)	(9.500)	(9.236)	(11.411)	(8.033)	(7.835)
Observations	1,692	1,692	1,692	1,692	1,692	1,692
R-squared	0.004	0.005	0.006	0.004	0.005	0.006
Robust t-statistics in parentheses						
* p<0.01, ** p<0.05, + p<0.1						

Table 2.8 Fixed-Effect Clustered Regressions Using The Grant Size As Control For HTRC

	Actual Grant Amount	Counterfactual Grant Amount
Log of Pre-Exemption Tax Share	-0.362** (-2.016)	-0.365** (-2.034)
Log of Weighted Replacement Grant Revenue Per Capita	0.056* (5.308)	
Log of Counterfactual Replacement Grant Revenue Per Capita		0.062* (5.691)
Log of Income Per Capita	-0.044 (-0.324)	-0.056 (-0.408)
Log of Population	-0.149 (-0.772)	-0.151 (-0.784)
Population density (100/sqmi)	-0.069* (-3.798)	-0.069* (-3.755)
Aggregate Sales Tax Rate	-0.029** (-2.254)	-0.030** (-2.321)
Log of Other Transfer revenue Per Capita	-0.007 (-0.833)	-0.007 (-0.888)
Service Sector Share of Local Wages	-0.032 (-0.234)	-0.026 (-0.196)
Agricultural Sector Share of Local Wages	0.252 (0.755)	0.235 (0.708)
Residential Share of Tax Base	0.625 (1.477)	0.641 (1.508)
Time Trend	0.022* (4.185)	0.021* (3.933)
Constant	3.181+ (1.967)	3.279** (2.035)
Observations	1,859	1,858
R-squared	0.491	0.494
Number of id	158	158
Robust t-statistics in parentheses		
* p<0.01, ** p<0.05, + p<0.1		

Table 2.9 Clustered Regressions Using Differenced Form Equations on the Counterfactual Grant

	Differenced Counterfactual
Change in Log of Pre-Exemption Tax Share	-0.081
	(-1.069)
Change in Log of Counterfactual Grant Revenue Per Capita	0.079*
	(6.074)
Change in Log of Income Per Capita	-0.365**
	(-2.270)
Change in Log of Population	-0.141
	(-0.674)
Change in Population Density	-0.053**
	(-2.186)
Change in Sales Tax Rate	-0.006
	(-0.681)
Change in Transfers Per Capita	-0.006
	(-0.646)
Change in Service Sector Share of Local Wages	-0.013
	(-0.091)
Change in Agricultural Share of Local Wages	-0.055
	(-0.252)
Change in Residential Share of the Tax Base	0.252
	(1.581)
Constant	0.024*
	(6.040)
Observations	1,691
R-squared	0.034
Robust t-statistics in parentheses	
* p<0.01, ** p<0.05, + p<0.1	

Table 2.10 Fixed-Effect Clustered Regression Using Percent Reduction in Total Tax Base as HTRC Control

VARIABLES	Average
Log of Pre-Exemption Tax Share	-0.330+
	(-1.789)
Percent Reduction in Total Tax Base Due to HTRC	-0.011*
	(-2.860)
Log of Income Per Capita	0.063
	(0.468)
Log of Population	-0.097
	(-0.498)
Population density (100/sqmi)	-0.066*
	(-3.825)
Aggregate Sales Tax Rate	-0.021
	(-1.581)
Log of Other Transfer revenue Per Capita	-0.007
	(-0.794)
Service Sector Share of Local Wages	-0.038
	(-0.282)
Agricultural Sector Share of Local Wages	0.291
	(0.837)
Residential Share of Tax Base	0.516
	(1.244)
Time Trend	0.028*
	(5.050)
Constant	3.073+
	(1.816)
Observations	1,859
Number of id	158
R-squared	0.482
Robust t-statistics in parentheses	
* p<0.01, ** p<0.05, + p<0.1	

Table 2.11. Regression on the Differenced Log of County Millage Rates

Dependent Variable is the Change in Millage Rate				
	(1)	(2)	(3)	(4)
Change in Log of Pre-Exemption Tax Share	0.552*		0.493*	0.496*
	(4.304)		(4.014)	(4.011)
Change in Log of Post-Exemption Tax Share		-0.048		
		(-1.526)		
Change in Percent Reduction in Tax Share Due to Exemption			0.002*	0.0036*
			(4.818)	(3.349)
Change in Square of Percent Reduction in Tax Share				-0.000
				(-1.529)
Change in Log of Median Home Value	-0.625*	-0.478*	-0.579*	-0.580*
	(-11.672)	(-8.935)	(-10.819)	(-10.833)
Change in Log of Income Per Capita	0.165	0.171	0.178	0.163
	(1.081)	(1.100)	(1.165)	(1.061)
Change in Log of Population	0.361+	-0.142	0.330+	0.325+
	(1.878)	(-0.966)	(1.750)	(1.707)
Change in Population Density (100/sqmi)	0.032	0.015	0.036	0.037
	(1.229)	(0.581)	(1.363)	(1.431)
Change in Aggregate Sales Tax Rate	-0.003	-0.002	-0.004	-0.004
	(-0.195)	(-0.155)	(-0.244)	(-0.231)
Change in Log of Transfer Revenue Per Capita	-0.006	-0.005	-0.005	-0.005
	(-1.219)	(-0.923)	(-1.038)	(-1.019)
Change in Service Sector Share of Local Wages	-0.005	0.010	-0.025	-0.026
	(-0.044)	(0.088)	(-0.251)	(-0.257)
Change in Agricultural Share of Local Wages	0.216	0.178	0.197	0.195
	(1.267)	(0.902)	(1.131)	(1.120)
Change in Residential Share of Property Tax Base	-0.530	0.281	-0.475	-0.474
	(-1.334)	(1.060)	(-1.241)	(-1.229)
Constant	0.037*	0.024*	0.031*	0.030*
	(8.899)	(7.362)	(7.426)	(7.036)
Observations	1,692	1,692	1,692	1,692
Number of id	158	158	158	158
R-squared	0.155	0.126	0.163	0.163
Robust standard errors in parentheses				
+ significant at 10%; ** significant at 5%; * significant at 1%				

Combining both the differenced model approach with the counterfactual grant revenue as a control from the HTRC program performs better than the previous differenced model approaches that used the tax price. These results are displayed in Column 1 of Table 2.9. While the tax share variable still fails to reach statistical significance, the grant revenue term, income per capita and population density are all statistically significant in this model. The value of the grant revenue estimate is 0.079, indicating that a one percent increase in grant revenue over time is associated with a 0.079 percent increase in combined revenues.

For the final approach to measuring the effect of the HTRC program on combined property tax and grant revenues I employ an alternate measure of the exemption's effect on the county tax base. Rather than looking at the effect of the grant on the median voter's tax price, I measure the proportion of the entire county tax base that becomes exempt from the property tax. I still use the ratio of the median value home to the county tax base to capture the median voter's share of spending. Column 1 of Table 2.10 contains the results of this modeling approach. I have already adjusted the coefficients to reflect that the dependent variable is log-transformed while the key explanatory variable is a raw percent. The estimate can be interpreted to indicate that a one percent reduction in the post-exemption share of the tax base due to the HTRC would be associated with a 0.01 percent increase in combined revenues.

Approach II: Difference in Log of Property Tax Rate

The results from the second set of equations, which use the first difference in the log of the property tax millage rate as the dependent variable, are displayed in Table 2.11. I include fixed effects in the equations, despite taking the first differences of the

variables, to control for factors that do not change over time that might have a consistent effect on how much millage rates change from year to year. These factors would be county characteristics that influence the responsiveness of local government to changing economic conditions. One example may be variation in property tax assessment practices based on the technical capacity of the local government.

The equations in Table 2.11 are ordered by their controls for the tax share.

Column 1 displays a naïve model that includes the change in the log general tax share Δp_{it}^G and does not measure the effect of the replacement grant. Column 2 uses the change in the log of the post-exemption tax price $\Delta \widehat{p_{it}^{GE}}$ as the primary explanatory variable, while Column 7 includes both Δp_{it}^G and the differenced percent change in the tax share due to the homestead exemption $\Delta \% \Delta p_{it}$, and Column 8 adds a square term of $\Delta \% \Delta p_{it}$ to the structure of Column 7.

The most striking aspect of this set of estimates is that the sign on the pre-exemption tax share variables shown in Columns 1,3 and 4 are all positive. This is the opposite of the expected sign for a tax price. A positive elasticity estimate indicates that, holding all other factors constant, growth in the tax share is associated with increasing millage rates. It would be expected, instead, that as the tax price increases the median voter would prefer lower taxes and a lower level of public services. One likely cause for this result is the relationship between the explanatory variables. Median home value enters into these equations in three places: through the numerator of the general tax share, the denominator of the percent reduction in tax share due to the homestead exemption, and as a scale variable on its own. A marginal increase in the general tax share while holding the median home value constant would require a reduction in the gross tax base.

The positive sign on the general tax share variables may therefore be due to smaller-tax-base counties relying more heavily on the property tax. The significant and negative sign on the change in the median home value variables appears to support this interaction between the elements of the estimated model.

In contrast, the estimates of the homestead exemption's effect on the millage rate are consistent with the theoretical predictions of the model. From Column 4 of Table 2.11, a one percent reduction in $\% \Delta p_{it}$ is associated with a 0.36 percent increase in the millage rate. The statistically significant relationship between changes in the tax rate and $\% \Delta p_{it}$ suggests that local officials raised the property tax rates in order to shift some of the tax relief grant to increase local expenditures. This result adds to the findings from the first empirical approach because it emphasizes the responses of individual counties to changes in the tax price over time.

Post-Estimation

Both empirical approaches rejected the null hypothesis that the exemption would be 'revenue neutral' and simply provide tax relief without any impact on revenues or on the millage rate. At least a portion of the replacement grant appears to have been diverted to increasing local revenue per capita. A more concrete measure of how much of the grant was dedicated to this purpose may be obtained by applying the coefficient estimates towards post-estimation. I first calculate the predicted value of the aggregate property and replacement grant revenue, per capita for the 2007 year. I then compute a second set of predicted values generated using the same coefficients, except that I replace the estimate of the homestead exemption's effect on the tax price with the null hypothesis value of 0. This quantity represents the predicted sum of property tax and replacement

grant revenue if there had been no substitution effect associated with the state-funded exemption. After computing both sets of predicted values²¹ for the log of aggregate property tax and replacement grant revenue per capita, I reverse transform the values to real dollar amounts by exponentiation and multiplying by county population. I perform this procedure using the coefficients from Column 6 of Table 5.

Table 2.12 Post-Estimation For 2007 Data Using Column 6 Estimates from Table 2.5

Aggregate Predicted Revenue	\$1,416,445,442
Null Hypothesis Predicted Revenue	1,367,984,384
Difference	48,461,058
Total HTRC Payments To Counties - 2007	\$133,331,498
Percent	36.35%
Data from 149 Counties was used for this Procedure	

After generating the predicted values and reverse transforming them, I aggregated the values across all counties. The results of this post-estimation procedure are displayed in Table 2.12. 149 counties had complete data for the 2007 year. Total HTRC payments to all 159 county governments in that year amounted to \$137.6 million; the 149 counties present for the post-estimation received \$133.3 million of that total. The sum across counties of the reverse-transformed predicted value of property and replacement grant revenues is \$1,416,445,442, while the predicted value generated with the null-hypothesis value for the homestead exemption's effect is \$1,367,984,384, a difference of \$48.5 million. These results suggest that the substitution effected associated with the HTRC

²¹ I corrected for the distribution of the error term when I generated the predicted values.

program raised aggregate revenues from the property tax and the replacement grant by nearly \$48.5 million and that approximately 36.3% of the replacement grant revenue is shifted from reducing the tax burden to funding additional county expenditures. I performed this analysis using the results from Column 4 of Table 5 and obtained similar results. Extrapolating these findings to the HTRC grants provided to the other forms of local government in Georgia would suggest that, in 2007, approximately \$156.8 million of state funds intended for tax relief were redirected to increase local spending.

Fiscal Illusion

The key issue in estimating the impact of fiscal illusion on the local response to the exemption is determining how much of the shift was due to the median voter's informed price response and how much can be attributed to local officials capturing the unobserved portion of the grant. I argued above that if the price response to changes in tax share caused by the exemption is greater than the price response to changes due to other factors, then there is evidence of fiscal illusion. This is because local officials would be expected to engage in budget maximizing behavior and spend the entire unobserved portion of the grant that they have captured. Alternatively, the median voter would support higher spending in accordance with the price elasticity of demand for public goods. There is no room in the model for a public official that chooses to raise revenues net of an unobserved grant at the same ratio as the median voter would have chosen were she aware of the funds. This is because the key assumption of the model is that the public official seeks to maximize their budget. Empirically, however, this latter scenario cannot be distinguished from an outcome driven by a fully informed median voter.

The point estimates of the coefficients on Columns 3 and 6 of Table 2.5 for the HTRC's effect on tax price are smaller than the coefficients on the general tax share and it therefore does not appear that Georgia county governments are raising revenues at a greater rate than could be explained by the informed median voter price effect. If the coefficients on the exemption's price effect had been larger than the general share's effect, then an estimate of the magnitude of fiscal illusion could have been generated by performing a post-estimation procedure similar to the one implemented above. This would be performed by generating predicted values where the general tax share's estimated coefficient is applied to the exemption's effect on the tax share. This predicted value could then be compared to the predicted values from the actual coefficients to obtain a ratio that represents the share of the substitution effect that exceeds the median voter's price response. The empirical findings from this analysis, however, find no evidence that fiscal illusion is a significant determinant of the substitution effect created by the HTRC program.

Conclusions

This study evaluated the effectiveness of state-funded homestead exemptions in providing property tax relief. In Georgia, a state-funded exemption increased revenues by more than a third of the amount of the state transfer. The goal of the program was to shift part of the cost of funding local services to the state. The increase in net property tax revenue is an unintended consequence of the program. Judging this policy by the criteria of providing property tax relief, the increase in net revenue represents a failure of the policy to achieve its intended goal and a misallocation of funds.

Other states such as New York and California may also need to consider whether their own state-funded homestead exemptions are similarly failing to achieve their intended purpose of reducing the property tax burden. Given the level of state funds allocated to this type of program, these programs should be prime targets for policy reform that would replace state-funded exemptions with more effective types of tax relief. Georgia has already eliminated funding for the HTRC, though there is some talk of restoring it when the state budget situation improves. Instead of returning to this ineffective policy, it may be more effective to select an alternative form of providing local tax relief.

The portion of the substitution effect that originates from the median voter's informed preference for a higher level of services due to the lower tax price may be a rational choice that improves taxpayers' welfare. From the standpoint of policy analysis, however, this argument may be insufficient to support the use of a state-funded homestead exemption. Facilitating additional local spending is a separate state policy objective that could be pursued through other means that more effectively align with state policy-makers' objectives. Rather than funding general local spending, state-officials are likely to prefer specific local programs that provide benefits either regionally or at the state level. These services can be more effectively target through restricted matching grants that align with state-level budgetary preferences.

Within a context of limited state resources, expensive state programs that fail to achieve their intended effect should be targets for reassessment and possible elimination. This paper has provided some evidence that a significant share of revenue dedicated to tax relief instead acts as a matching grant to local governments. Although the political

objective may be to simply demonstrate that state officials are doing something to appease voters on the issue of excessive property tax burden, there are many other means of providing tax relief that have greater potential for actually producing the intended results.

Circuit breakers may be more effective in ensuring that the burden of the tax does not exceed a specific threshold for individual homeowners. Exemptions provide no such qualification. It is also possible better target the aid to lower and moderate income homeowners so that wealthier homeowners that are relatively in less need of state assistance are not swept into the group of recipients. This would lower the cost of providing tax relief. Another benefit of providing tax relief through a circuit breaker is that by administering the tax relief through the state income tax system local government is circumvented and the potential for a flypaper effect is eliminated. By removing a middle agent between the originators of the policy and its intended beneficiaries the policy may become more visible to taxpayers. As opposed to the conventional norm in tax policymaking, increasing the visibility of this type of program may actually align with policy-makers interests.

CHAPTER III

MIND THE GAP: A MODEL OF PROPERTY TAX DETERMINATION

Introduction

One of the challenges in developing a theoretical understanding of volatility for the property tax is incorporating the degree of control that local officials have to change the rate or the base for the tax on an annual basis. There is a fundamental difference in the role the property tax plays in the fiscal structure of local governments able to control the size of their annual levy versus those governments that are subject to binding tax limitations²². In the first case the property tax can serve as the marginal dollar of revenue that the locality raises and it is possible to offset cyclical reductions in other revenue sources with compensating changes to the levy. Where tax limitations are present the property tax is more likely to serve as an initial foundation for the annual budget. In that case the levy is often set to the maximum allowed each year and other sources such as sales receipts or revenue from fees and charges will serve as the marginal tax dollar. There are, therefore, depending on the institutional framework of the state, at least two different behavioral patterns that describe how local officials determine the size of the property tax levy.

²² Joyce and Mullins (1991) define binding tax limitations as those that either limit the growth of the actual levy or limit both the rate and the assessed value. All other forms of tax limitation can be circumvented.

In this essay I analyze how the property tax is used by local governments in an environment without binding tax limitations. If local officials are able to use the millage rate and assessment practices to achieve a desired property levy, what set of rules or behavioral patterns would they follow as they use this power? One model of property tax rate determination is the ‘residual rule’. Under this approach the property tax levy fills the gap between budgeted expenditures for the year and projected receipts from all other available revenue sources. Local officials set the property tax millage rate so that the tax yields just enough revenue to balance the budget. An implication of adhering to this rule is that in the event that other local revenues fall due to a recession the property tax rate will need to be raised in order to replace the lost receipts. This behavior allows the local government to stabilize its overall revenues by increasing the short-term volatility of the property tax. The pursuit of stability for the local government comes at the cost of homeowners' ability to predict their annual property tax bills.

In contrast to the ‘residual rule’ model, an alternative model of property tax growth predicts that receipts will grow in proportion to the property tax base. This model predicts less volatility in the yield of the property tax and no role for the property tax in counter-balancing cyclical volatility in the other local revenue sources.

The research objective of this paper is to compare these two models empirically in order to determine which model more accurately describes the pattern of changes to the millage rate and variation in the overall property tax levy. The policy implications for following the ‘residual rule’ approach are significant because it would demonstrate a tradeoff between overall stability in the tax structure and the predictability of the property tax. Stability is a concern for ensuring the adequacy of local fiscal policy across

economic cycles, while predictability is a concern for taxpayers who want to know their future tax liability and for policymakers interested in the political viability of their tax regime. The danger of following the ‘residual rule’ is that local officials that use the property tax to smooth their budget may surprise taxpayers with unexpected changes to the levy and incur political costs that threaten the sustainability of financing services through the property tax.

In this essay I focus on the volatility of the level of revenues derived from the property tax as opposed to changes in the tax base. This differs from the traditional focus of research into local public finance, but it is appropriate for two reasons. First, revenue volatility is a relevant policy issue inasmuch as it becomes a source of fiscal stress during recessions. Local control over the millage rate provides governments with a means to compensate for cyclical drops in other revenue sources with more income elastic tax bases. Long-term average universal assessment practices also contribute to stabilizing local budgets by shielding the property tax base from short-term volatility in market property values. Because the tax is only applied to the assessed value of property, the impact of immediate spikes or drops in market values have only a muted impact on the recognized tax base. If local officials are truly free to set any millage rate in order to meet their budget balancing rule, then the primary consequence of a change in the base would be a compensating change in the nominal millage rate, not a change in the level of revenue.

A second reason to focus on the actual revenues and not the base is the issue of tax predictability. Predictability refers to taxpayers’ perception of how much the property tax levy changes from year to year and is a central factor in political opposition

to the property tax. In *Nordlinger vs. Hahn* (1992), the Supreme Court case upheld California's property tax because provides homeowners with greater predictability in regards to their future property tax liability. A focus on the base would ignore the changes to the millage rate and the levy that a budget-balancing role for the property tax mandates. This omission consequently misses an important aspect of the tax that impacts its long-term political feasibility.

The primary contribution of this paper is to deepen our understanding of the role of the property tax in local tax structures during times of economic volatility. The underlying questions asked are how do local policymakers use the property tax to promote an adequate and stable fiscal structure and what are the implications of this approach? The framework outlined in this paper describes an interconnected revenue system in which the relative responsiveness of public expenditures and non-property tax revenues to changes in personal income, along with the share of revenue provided by property taxes, will determine the size of the shift in property levies local tax officials will have to impose in order to comply with their budget balancing rule. This model predicts the size and the direction of the changes to the property tax levy local officials will make in order to offset shocks to their other revenue sources and stabilize the overall revenue stream.

I test this budget balancing model against an alternative model that assumes that the property levy is independent of other revenue sources and is instead determined by growth in the tax base. Policy makers following this alternative model do not use the property levy to stabilize their overall revenues in response to short-term economic shocks. I estimate both models using data from Georgia school districts and then

generate predicted property tax levies to determine which model is able to generate more accurate revenue projections. I find that the budget-balancing model is better able to predict property tax revenues for the districts that have higher incomes per capita and higher populations as well as those districts that rely on the property tax for a larger share of their revenues.

The findings of this paper will be of interest to local tax officials because it reveals the interrelationship and possibly a tradeoff between the pursuit of stability for the overall revenue structure and the predictability of the property tax levy. For a local government considering rebalancing its revenue portfolio (e.g. replacing some property tax revenue with a sales tax) in order to pursue increased stability, this framework provides insight into how this change will affect the future predictability of the property tax. Voters considering such a change to the tax structure could use this information to be better informed about the implications of the policy change on future swings in their levies. This additional information can improve local tax design in order to better pursue the goals of revenue adequacy and political sustainability.

Section II of this paper reviews the literature on property tax stability. Section III develops a model of the budget-balancing role of the property tax. Section IV provides a preliminary analysis of the pattern of property tax rate changes among counties and school districts in the state of Georgia. Section V describes the empirical approach taken to estimate the parameters of the framework and to test for an impact of revenue diversification on property tax predictability. Section VI introduces the data used in the analysis. The results of this estimation are then presented in Section VII and the post-

estimation forecasts are discussed in Section VIII. The paper then concludes with a discussion of future directions for this line of research.

Property Tax Stability

Several studies of the stability of state and local revenues have addressed the property tax. The seminal paper in the stability literature is Groves and Kahn (1952), in which the authors obtain some of the first estimates of the long-run relationship between state revenues and personal income. The authors estimate income elasticities for various sources of state revenue including two that are property tax related. Using Wisconsin data, Groves and Kahn estimate the income elasticity of the general property tax base, as well as the income elasticity of actual receipts from the property tax on utilities. The authors report an income elasticity of .22 for the assessed values of general property and .08 for utility property tax receipts. The authors ascribe these extremely low values to two factors. First, they argue that changes in the value of the property tax base are due to other causes such as population growth. Second, they argue that the effect of income on property values will be lagged due to either deficient assessment methods or to legal requirements that property be assessed “at the full value which could ordinarily be obtained therefor at private sale.”²³ Adherence to such laws may lead assessors to normalize their valuations of property and reduce the impact of market volatility on the property tax base. Their results, however, were obtained using a simple log-transformed

²³ Wisconsin Statutes 70.31 (1). Online: <https://docs.legis.wisconsin.gov/statutes/statutes/70/32>

bi-variate regression model and no statistics on the statistical significance of these estimates were reported.

Another early study of the stability of the property tax is found in Wilford (1965). The author uses a regression model similar to Groves and Kahn's to estimate revenue-income elasticities, but employs a multivariate equation that controls for personal income and the tax rate, rather than Groves and Kahn's bi-variate approach that regressed revenues on income alone. Wilford obtains a revenue-income elasticity of 1.01 for state property tax revenue in Texas over a period from 1947 to 1960. He also estimates revenue elasticities with respect to per capita income. He finds that these elasticity estimates for all the revenue sources examined are generally higher than those for revenue alone. The property tax revenue elasticity estimate increases to 1.61 when measured using income per capita. Wilford interprets this to indicate that "during short-run periods when population is relatively stable and per capita income fluctuates, the tax structure of Texas is much less stable than one would conclude by using traditional methods of determining stability." (p. 312) Comparing Wilford's results with those of Groves and Kahn shows conflicting results on the stability of the state property tax relative to personal income. Both studies were limited by the econometric techniques available at the time, however, and neither set of results can really satisfy our current questions regarding the characteristics of property taxes.

Following Groves and Kahn and Wilford, there have been many advances in the study of stability that focused on other revenue sources. Among these are as the development of separate measures for short and long run income-revenue elasticities (Williams et al. 1973; Dye and McGuire 1991), the refinement of elasticity estimation to

account for serial correlation and asymmetric deviations from the long run equilibrium (Sobel and Holcombe 1996; Bruce, Fox, and Tuttle 2006), and the development of a portfolio approach to conceptualizing the overall growth/stability tradeoff of a revenue structure (White 1983a; Misiolek and Perdue 1987a). Also important is the approach conceptualizing revenue stability that abandons the revenue-income elasticity approach and instead looks at the deviation of actual revenues from forecasted receipts over time (See Dye and Merriman, 2004). The empirical content of these more recent analyses focuses almost entirely on state-level revenue sources, particularly in determining the relative stability of state sales and income taxes and evaluating the overall stability of the state tax structure. These advances have not, however, been applied to examining how overall growth and immediate shocks influence the yield of the property tax.

Multiple factors explain the relative lack of attention to the stability of the property tax. One reason is that the frameworks used to understand revenue volatility for sales, income and other taxes cannot be easily extended to the property tax. Gentry and Ladd (1994) discuss this difficulty in their effort to apply the portfolio approach to measuring the stability of alternative state and local tax structures. In their discussion of why they exclude North Carolina's property tax from their analysis, they argue that

“[b]ecause local property tax revenues, especially in North Carolina, are driven almost exclusively by the growth in local spending, our approach to measuring growth and stability is not readily extended to local taxes. In the context of local property taxes, the approach would yield something close to the growth and instability of local spending rather than the growth and instability of the tax. This link between spending growth and tax growth presents less of a problem for state taxes...”(p. 766)

In this statement the authors recognize one of the key features of the property tax that distinguishes it from other local revenue sources – that in many states the tax rate on local

property is actively changed from year to year in order to meet budgetary targets. One way that this is done is to set the levy to be the difference between planned expenditures for the year and expected receipts from other revenue sources. The property tax is the revenue source that local officials have the most control over, so as expenditures grow the property levy becomes the marginal revenue dollar used to pay for the additional spending. The stability of the property tax cannot be accurately studied without accounting for way that local officials use the tax to balance their budgets.

Williams et al. (1973) discuss the property tax in their analysis of non-income determinants of tax yield and their impact on revenue stability. They observe that in many jurisdictions millage rates are changed almost annually. The authors argue that there are two alternatives ways to view such a pattern of changes within the context of stability. One approach is to eliminate the impacts of changes to the rate or the base on the yield of a tax because they are discretionary policy changes. This view narrowly defines stability as the variability in the yield of a fixed tax instrument with a given rate and base with respect to income. An alternative view considers the variability of the revenue stream without adjusting for rate changes. They observe “that rate change may be a frequent, acceptable practice which permits yield growth from a lagging base, though it may cause instability. ... Hence, a tax which requires frequent rate increase ought not be judged *a priori* stable or slow growing if in practice such rate changes are a regular feature of its history.” They support this by showing how the long-run growth rate of tobacco and alcohol taxes was primarily the consequence of regular increases in the respective tax rates. The essential point is that the authors recognize that for many revenue sources, including the property tax, an analysis which only considers the base

misses key policy-related factors that influence the stability of the ultimate yield of the tax.

The use of millage rate changes to compensate for slow growth in the assessed property base is also discussed within the tax and expenditure limitation (TEL) Literature. Some states place legal limits on the annual rate of growth for assessed property values. Joyce and Mullins (1991) show that local officials can circumvent such statutes by regularly increasing the property tax rate. For this reason, they classify assessment limits without accompanying limits on the millage rate or the overall levy as non-binding constraints. Changes to the millage rate can be used to compensate for a limited tax base, either because its growth is capped through a legal limitation or because the income elasticity of the base is low. On the other hand, in jurisdictions with binding tax limitations, those that either directly cap the levy or limit both the rate and the assessed base of the tax, it is not possible for officials to adjust the millage rate to compensate for inadequate revenues or slow growth of the tax base²⁴.

This review of the stability literature reveals a gap in our understanding of how the predictability of the property tax is influenced by policies which change the rate of

²⁴ It may be necessary to use two different behavioral frameworks for viewing the stability of the property tax based on whether the jurisdiction is subject to binding tax limitations. Whether or not a given jurisdiction is subject to a TEL would determine whether public officials treat the property tax as their marginal revenue dollar in their fiscal structure. A binding tax limitation, by design, leaves public officials with little control over the yield of the tax. This lack of control would prevent local officials from following the residual rule of levy setting. Instead, property tax revenue would be an initial 'foundation' level of revenue that functions as a fixed asset in each year's budget. In contrast, jurisdictions that are not subject to TELs are able to exert control over the size of the property levy each year. The opportunity to change the millage rate annually makes the property tax the revenue source that the locality has the greatest degree of control over and therefore causes it to become the marginal revenue dollar in local fiscal planning.

the tax in response to receipts from other revenues. Existing methods for measuring revenue-income elasticities do not take this type of policy into account.

The Budgeting Role of the Property Tax

In this section I propose a model of local revenue growth that explicitly recognizes the potential for local officials to set the property tax rate and the overall levy in response to receipts from other revenues. I describe this behavior as adherence to the ‘residual rule’ or the ‘budget-balancing’ rule. As mentioned earlier, this framework applies only to those localities that are not constrained by TEL’s that bind the rate or the overall property levy. The objective of this model is to depict how a change in personal income will affect expenditures, non-property tax revenues and how the residual rule policy then leads to a change in the property tax levy. The end result of the model is an alternative representation of the short-run income elasticity of property tax revenue that encompasses the pattern of rate changes that adherence to the residual rule requires.

Within this framework of property tax determination, the property levy functions as the marginal revenue dollar used to balance the budget. Local property tax rates are chosen so that the levy will be equal to the difference between the budgeted local expenditures and the expected receipts from all other sources. This relationship is depicted in Figure 1. This practice makes property tax growth relative to income dependent on three factors: growth of the property tax base, the level of budgeted expenditures, and the yield of other revenue sources.

Figure 3.1 The Residual Rule

Budget Gap		Property Tax Levy	
Budgeted Expenditures	-	Expected Receipts From Other Sources	=
		Assessed Property Value	* Millage Rate

The first element of Figure 3.1 is budgeted expenditures. I assume that the budgeted level of expenditures selected by public officials is derived from an expression of the demand for local government expenditures. The demand for local public spending has been analyzed in the public finance literature, most notably by Borcharding and Deacon (1972). Personal income was one of the determinants of demand they examined and the authors reported income-elasticities for local public spending within the range of 0.2 and 1.0. These estimates indicate that local expenditures are a normal good and that higher incomes will result in higher per-capita public spending.

The second factor in determining the budgeted property tax levy, the expected revenues from all other sources, is also influenced by changes in real income. Local governments with their own income and sales taxes are exposed to the revenue-income elasticities for those sources. Intergovernmental transfers that are based on a shared and fixed proportion of tax receipts will also vary according to these elasticities over both the long and short run. Transfers that are determined as a local aid line item in state budgets may be even more volatile than the overall state tax structure if local aid becomes less of a state spending priority during periods of fiscal stress.

The difference between budgeted expenditures and expected receipts from non-property tax revenue sources is the budgetary gap that the property tax levy will need to fill in order for the jurisdiction to balance its budget. The relative short-run income

elasticities of expenditures and non-property revenue will determine how the size of the gap changes in response to a shock to personal income. If a recession causes income to drop and non-property revenues fall faster than the budgeted level of public spending then the gap will widen and the property tax levy will need to be increased in order to provide the necessary funding.

The right-hand side of Figure 1 displays the two determinants of the property levy: the assessed property value and the property tax rate. Local officials can change either of these two elements in order to alter the levy in response to an income shock. Reassessing the base is an unlikely approach to respond to a short-run drop in revenue, however, because the technical constraints of reassessing property values will take too long to address the immediate and temporary shock to non-property tax revenues. Another way to change the property assessment would be to alter the assessment ratio, if the jurisdiction is legally allowed to do so under state law. An assessment ratio sets the taxable value of a given property at a certain percentage of the market value. Changing the ratio would be an extreme measure that would likely require a local referendum and would likely take too long to be a suitable policy option for responding to short-run shocks. Since the focus of the budget balancing model is on the short-run revenue elasticity I assume for the sake of simplicity that income-driven adjustments to the tax base occur beyond the time-horizon of the analysis.

Under the residual rule of property tax determination, the budgeted levy is the difference between budgeted expenditures (BE) and non-property tax revenue (NP). This is depicted in Equation (3.1) as a balanced budget identity. The underlying assumption of this model is that, in a given time period, both BE_t and NP_t are assumed to

be functions of income (I_t) and they are independent of the property tax levy (PT_t). After local officials have chosen their level of expenditures and have finalized their projections of NP_t , a millage rate is chosen that determines what the level of property taxation will be. The short-run stability of the property tax will depend upon the relative magnitudes of the short-run income elasticities of BE and NP and the resulting variation in the budget gap.

$$PT_t = BE_t - NP_t \quad (3.1)$$

Where:

PT_t is the Property Tax Levy in period t

BE_t is Budgeted Expenditures in period t

NP_t is Non-Property Tax Revenue in period t

In contrast to the budget balancing rule of property tax determination, the alternative model that I use for comparison assumes that revenues from all sources are determined first and then expenditures are set given the available funds. The only cause for changing the property tax rate would be to compensate for a low long-run revenue-income elasticity of the base in order to maintain a near constant proportion of overall revenues generated by the property tax. Local officials would not, however, adjust the rate in response to short-term shocks to revenues. Instead they would keep the rate constant and the short-run stability of the property tax will reflect the short-run income-elasticity of the property tax base.

Because the budgeted levy is the difference between budgeted expenditures and expected receipts from other sources, the impact of growth in income on the size of the levy will depend on the income elasticity of demand for public expenditures ($\epsilon_{BE,I}$) and the income-yield elasticity of non-property tax revenues ($\epsilon_{NP,I}$). The size of the change in the levy will be equal to the difference in expenditure growth and non-tax revenue

growth. This occurs automatically through the local budgeting process. The proportional change in the levy will also depend upon the share of total revenues derived from the property tax.

In the following discussion I demonstrate how the interaction between income growth, expenditures and revenues operates under the budget balancing rule. I first represent in Equation (3.2) the level of property tax in period 2 after an increase in income relative to period 1. BE_1 and NP_1 represent budgeted expenditures and non-property tax revenues, respectively, at period 1. The percentage change in income from period 1 to period 2 is represented as $\% \Delta I_{1,2}$. PT_1 and PT_2 represent the property tax levy in each period. Equation 2 represents PT_2 as the new difference between budgeted expenditures and non-property tax revenues after both quantities have adjusted to the new level of personal income. This adjustment is given by multiplying each by one plus the product of their respective elasticities and the percent change in income over time.

$$PT_2 = BE_1 \left(1 + (\epsilon_{BE,I} * \% \Delta I_{1,2}) \right) - NP_1 \left(1 + (\epsilon_{NP,I} * \% \Delta I_{1,2}) \right) \quad (3.2)$$

To obtain the change in the property tax levy over time I subtract equation (3.1) from (3.2) to obtain:

$$\begin{aligned} \Delta PT &= PT_2 - PT_1 \\ &= BE_1 \left(1 + (\epsilon_{BE,I} * \% \Delta I) \right) - BE_1 - NP_1 \left(1 + (\epsilon_{NP,I} * \% \Delta I) \right) + NP_1 \end{aligned} \quad (3.3)$$

Equation (3.3) simplifies to Equation (3.4) after noting that $\epsilon_{BE,I} = \frac{\% \Delta BE}{\% \Delta I}$ and $\epsilon_{NP,I} =$

$$\frac{\% \Delta NP}{\% \Delta I}$$

$$\Delta PT_{1,2} = (BE_1 * \% \Delta BE) - (NP_1 * \% \Delta NP) \quad (3.4)$$

I then convert to the percent change in the property tax from time period 1 by dividing $\Delta PT_{1,2}$ by PT_1 .

$$\frac{\Delta PT_{1,2}}{PT_1} = \frac{(BE_1 * \% \Delta BE) - (NP_1 * \% \Delta NP)}{BE_1 - NP_1} \quad (3.5)$$

Dividing (3.5) by $\% \Delta I$ allows us to obtain the revenue income elasticity of the property tax for jurisdictions adhering to the budget balancing rule, as expressed in (3.6).

$$\begin{aligned} \epsilon_{PT,I} &= \frac{(BE_1 * \% \Delta BE) - (NP_1 * \% \Delta NP)}{\% \Delta I (BE_1 - NP_1)} \\ &= \frac{(BE_1 * \epsilon_{BE,I}) - (NP_1 * \epsilon_{NP,I})}{(BE_1 - NP_1)} \end{aligned} \quad (3.6)$$

Another way of viewing Equation 3.6 is to convert the quantities to the proportion of revenues derived from the property tax. Let S represent the share of revenues derived from the property tax.

$$S = \frac{BE_1 - NP_1}{BE_1}$$

Multiplying both the numerator and the denominator of (3.6) by $\frac{1}{BE_1}$ and substituting in

for S yields the following form:

$$\begin{aligned} \epsilon_{PT,I} &= \frac{\epsilon_{BE,I} - (1 - S) * \epsilon_{NP,I}}{S} \\ &= \frac{(\epsilon_{BE,I} - \epsilon_{NP,I}) + S * \epsilon_{NP,I}}{S} \\ &= \frac{(\epsilon_{BE,I} - \epsilon_{NP,I})}{S} + \epsilon_{NP,I} \end{aligned} \quad (3.7)$$

The property tax income elasticity described by (3.7) represents the variation in the property tax levy caused by public officials following the budget balancing rule. The structure of (3.7) reveals that the degree of variation is determined by the relative income elasticities of expenditures and the non-property tax revenue. The intuition behind this is that the relative magnitude of the elasticities determines whether the gap between budgeted expenditures and other revenues is growing or shrinking in response to a change in personal income. Growth in the gap would be caused either by expenditures growing faster than the yield of non-property tax revenues, or, in the case of declining income, other revenues falling faster than expenditures. If the gap is growing then the property tax rate will need to be raised in order to offset the gap. The percent change in the property tax levy required to meet the budget requirement is dependent on the share of total revenues provided by the property tax.

Equation (3.7) enables a comparison between the budget-driven volatility of the property tax with the stability of non-property tax revenues. When $\epsilon_{BE,I} > \epsilon_{NP,I}$ officials' budget balancing behavior will cause the property tax levy to be more elastic than non-property tax revenues. Alternatively, if $\epsilon_{BE,I} < \epsilon_{NP,I}$ then the property tax will be less elastic than other revenues. This latter case is interesting because it predicts that local governments would use the growth in their non-property tax revenues to reduce their reliance on the property tax. This would partially negate the overall budgetary impact of the "automatic" tax increases generated by the income elastic portion of the tax structure described by Oates (1975). Expenditures would increase with an increase in income, but would do so according to the income elasticity of demand for public spending, rather than the income elasticity of the non-property tax revenue sources.

The direction of the effect of the property tax share of revenues (S) on $\epsilon_{PT,I}$ is inverse to the relationship between $\epsilon_{BE,I}$ and $\epsilon_{NP,I}$. Table 3.1 provides a summary of the effects. If $\epsilon_{BE,I} > \epsilon_{NP,I}$ then an increase in S reduces $\epsilon_{PT,I}$. In this case, an increase in income widens the gap between expenditures and non-property receipts. Jurisdictions that rely on the property tax for a large share of their budget make a proportionally smaller adjustment to the property levy to compensate for the other slow-growing sources. Governments that have diversified away from the property tax would need to make a larger percent change to the property levy to compensate for the drop in other revenues. As S approaches unity $\epsilon_{PT,I}$ converges on a lower limit of $\epsilon_{BE,I}$.

Table 3.1 Effect of the Tax Share (S) on $\epsilon_{PT,I}$

Direction of Change in S	$(\epsilon_{E,I} > \epsilon_{NP,I})$	$(\epsilon_{E,I} < \epsilon_{NP,I})$	$(\epsilon_{E,I} = \epsilon_{NP,I})$
Increase S	Reduce $\epsilon_{P,I}$	Increase $\epsilon_{P,I}$	Share is irrelevant
Decrease S	Increase $\epsilon_{P,I}$	Reduce $\epsilon_{P,I}$	Share is irrelevant

Reversing the relationship to $\epsilon_{BE,I} < \epsilon_{NP,I}$ causes an increase in S to raise the income elasticity of the property tax. For values of S less than 1 $\epsilon_{PT,I}$ will be less than $\epsilon_{BE,I}$, but it will converge on the budgeted expenditure elasticity as S goes to 1. More interestingly, as S decreases the income elasticity of the property tax declines and at a certain point can become negative. In this case a drop in income may result in officials raising the property tax levy in order to compensate for a drop in other revenues. For example, a school district that is highly dependent on state grants may need to significantly raise the property tax rate if the grants are drastically cut during a recession if it is to avoid major spending reductions.

Lastly, if $\varepsilon_{E,I}$ is equal to $\varepsilon_{NP,I}$ then the property tax share falls out of Equation 3.7 entirely. In this case the other revenues grow in proportion to expenditures and the rate of the property tax is managed such that the revenue shares are held constant.

This model of property tax determination describes how local officials would set the levy if they follow the budget-balancing rule. The remainder of this paper seeks to test empirically whether there is any supporting evidence that this type of behavior actually exists.

Preliminary Analysis

The previous discussion outlined one possible model for determining the rate and the overall levy of the property tax. The key feature of the budget-balancing model is that the level of the tax is set in response to budgeted expenditures and expected receipts from other revenue sources. The alternative hypothesis that I consider in this analysis is that the property tax is set independently of other factors. Instead, the primary factor in changing the millage rate is to offset a relatively income-inelastic property base.

Williams et al. (1973) indicate that an income inelastic revenue source would require regular rate increases in order to maintain adequate yield in proportion to the long-run growth of the fiscal structure. In contrast, the millage rate of the tax in a jurisdiction adhering to the budget-balancing rule would be expected to show a greater degree of variation as officials respond to short run shocks to income.

A visual inspection of the pattern of property tax rate changes in Georgia shows a considerable variation in millage rates over time. Figure 3.2 displays data from 185 school districts in Georgia from 1999-2007. There are actually only 180 school districts in Georgia, but five independent school districts span two counties and assess different

property tax rates in each. This graph is a histogram of the number of times each county changed its millage rate over the nine-year period. Twenty-four school districts changed their millage rate all eight years over this period. Thirty-two districts changed the rate all but one of those years and another thirty districts changed their rate in all but two of these years. Three districts kept their rates constant over the entire period. Regular changes to the millage rate are not necessarily evidence that the property tax is used to adjust for expenditure growth if these changes are done merely to compensate for a slow growing base, as described by Joyce and Mullins (1991). It would be expected, however, that if compensating for an inelastic base were the primary motivation for changing the rate then most rate changes would be positive.

Figure 3.2

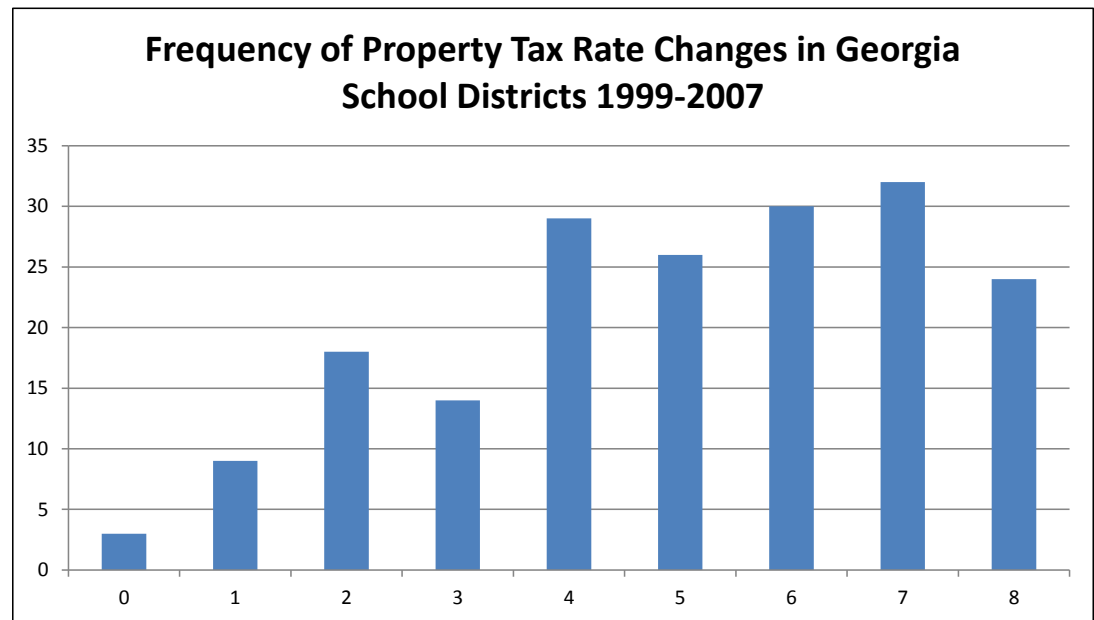
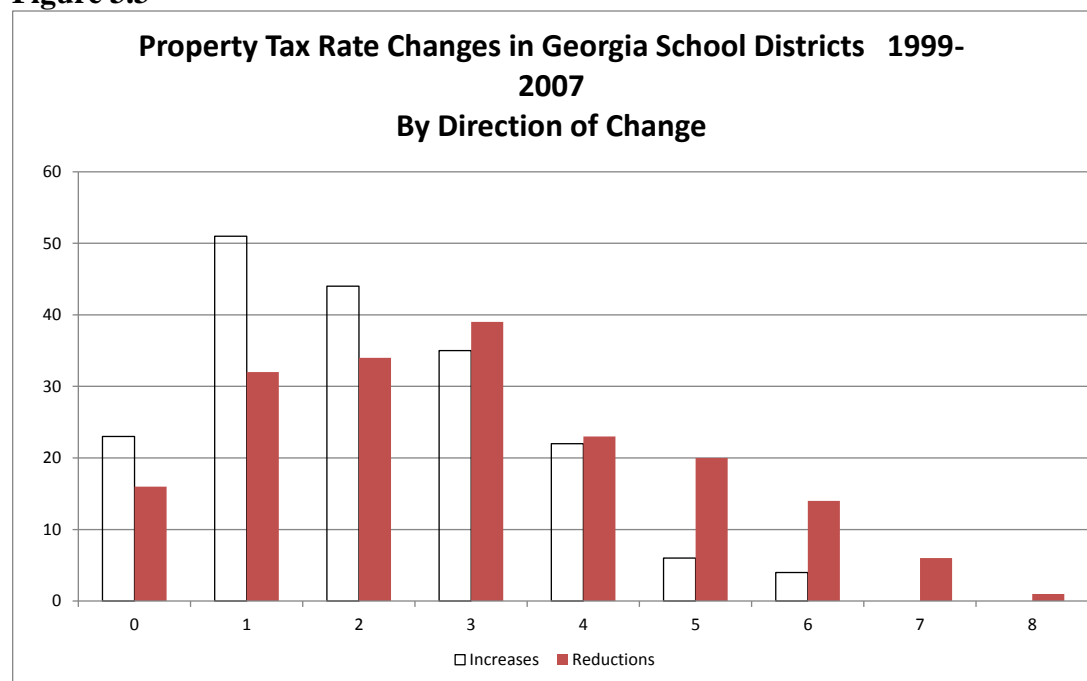


Figure 3.3 depicts the same millage rate changes listed in Figure 3.21, but they separate out the increases from the reductions in the rates. Figure 3.3 shows that the positive and negative rate changes in the school districts are similarly distributed with a

left-skewed shape, though the reductions have a fatter right-side tail. The overall change counts, however, show that, across all 185 districts, the tax rates were increased 386 times and reduced 543 times. These counts indicate that reductions to the property tax rate occur with similar, if not greater frequency as rate hikes. This pattern does not appear consistent with the explanation that rate changes are primarily driven by the need to compensate for an inelastic property tax base.

Figure 3.3



One caveat to this analysis of the rate changes is that these numbers do not account for the size of the change, only the direction. If the rate reductions are relatively small in comparison to the rate increases the overall pattern would fit a policy of adjustment for a lagging base. Also, there are other factors that may cause a rate reduction other than adherence to the budget balancing rule. In Georgia the adoption of the Local Option Sales Tax required the local governments to ‘roll back’ their property

tax levies dollar for dollar for their sales tax receipts. The Georgia Municipal

Association summarized the manner that the rollback is computed:

“...[E]ach jurisdiction’s governing authority must calculate the millage rate necessary to produce property tax revenues which, combined with other local revenues, would generate sufficient funds to cover the jurisdiction’s general fund expenditures for that year. The millage rate is reduced by the amount that would produce an amount equal to that jurisdiction’s LOST distribution from the previous year. The remainder is the millage rate that is used to calculate property tax bills. ” (Georgia Municipal Association 2011 pp. 1)

In practice, however, local governments can choose the initial millage rate for the year so that the post-rollback rate generates the desired level of property tax revenue. Also, after the initial rollback has been implemented the future rollbacks will be much smaller; the first rollback adjusts for the entire new revenues stream while subsequent rollbacks adjust for growth in the existing revenue source.

This basic analysis of property tax rate changes is not conclusive evidence that local officials are setting the rate according to the balanced budget rule, but they are suggestive that this type of behavior may be a factor in the determination of local levies. The following section presents a more thorough analytical approach to identifying this effect.

Empirical Approach

In order to test the validity of the budget-balancing property tax framework, I generate two sets of short-run income elasticities for the property tax. The first will be calculated using the budget balancing model of property tax determination. The second income elasticity is estimated using the comparison model in which local officials make no adjustments to the millage rate in order to compensate for short-run shocks to other

revenue sources. Under this approach the tax rate is assumed to be held constant in the near term and the short-run variability of the property tax levy solely determined the variability of the property tax base. Using both sets of elasticities I will generate forecasts of the property tax levy given actual changes of income and compare the two models on their predictive power.

I will first estimate the key parameters of Equation (3.7) by performing separate estimates of $\varepsilon_{E,I}$ and $\varepsilon_{NP,I}$ for school districts in Georgia. These estimates will be taken over a subset of the panel data I possess. I will then use the estimates of the elasticities along with the actual changes to personal income to generate predicted values for the property levy over the remainder of the time series. I will then generate alternative predicted values for the property tax levy in which the levy is independent of other revenues and is dependent on changes in the property tax base and other economic characteristics.

To estimate the elasticity parameters, I adapt the methodology employed by Sobel and Holcombe (1996) and Bruce et. al (2006), though with some key differences. In both of these papers, the authors had access to long time series of data of approximately 40 years for their respective tax bases. Bruce et. al were able to estimate their model separately for each state, while Sobel and Holcombe only needed to estimate one model for their national aggregate of state tax bases. The data available for this analysis covers a shorter time span (1998 – 2009) and it was therefore not be possible to run separate time-series models for each local jurisdiction. On the other hand, the panel of school districts I have developed covers 159 separate districts. A greater number of cross-sectional units may compensate for the shorter period of observation.

Both Holcombe (1996) and Bruce et. al (2006) employ Error Corrected Models (ECM) to estimate short-run revenue-income elasticities. An ECM model is employed when it is possible that the long-run effect of a change in income may not be fully realized on yield of a tax until after an adjustment period. “[S]tability between tax bases and personal income need not hold in the short run; any differences between short and long-run income elasticities create deviations between the long-run equilibrium base and the current period base.” (Bruce et. al 2006, pg 319) The difference between the current level of the tax base and its long-run value can be measured using the current-period error term from an estimate of the long run income elasticity. It is therefore necessary to first estimate the long-run income-revenue elasticity and then use the residuals from that regression to inform the estimation of the short-run elasticity.

The long-run revenue income elasticity was estimated by both Holcombe (1996) and Bruce et. al (2006) using Dynamic Ordinary Least Squares Models (DOLS) . These models use leads and lags of changes to the explanatory variable to correct for serial correlation. The structure of the DOLS model is shown below:

$$E_t^i = \beta_0 + \beta_1 I_t^i + \sum_{g=-j}^j \gamma^{ig} \Delta I_t^i + \varphi_t^i \quad (3.8)$$

I estimate equation (3.8) using both expenditures and non-property tax revenues as the dependent variable. The I term represents district-level personal income. The Δ operator indicates the first difference over time. Sobel and Holcombe indicate that typically five sets of leads and lags are used in DOLS, but due to the relatively shorter time series in this panel I only use two degrees of leads and lags. At two degrees the second set of leads and lags were no longer statistically significant.

After Equation (3.8) is estimated for both expenditures and non-property tax revenues the residuals are retained to create the error correction term. The current period residual is given in Equation (3.9).

$$E^{it} - E^{it*} = \varphi_t^i = E^{it} - \beta_0 - \beta_1 I^{it} - \sum_{g=-j}^j \gamma^{ig} \Delta I_t^i \quad (3.9)$$

The ECM model controls for the deviation from the long-run equilibrium that exists at the beginning of the period. It does this by including the error term from the previous period, φ_{t-1}^i , as shown below:

$$E_t^i - E_{t-1}^i = \beta_1 (I_t^i - I_{t-1}^i) + \beta_2 \varphi_{t-1}^i + \mu_t^i \quad (3.10)$$

The β_1 term is the short-run revenue elasticity. The β_2 term represents the percent reduction in the deviation from the long-run equilibrium that occurs each period over time.

An implicit assumption of the ECM model described by (10) is that the adjustment to the long-run equilibrium is a symmetric response whether the jurisdiction is currently above or below the long-term equilibrium. Bruce et. al (2006) relax this assumption and allow asymmetric responses by introducing an indicator term (DB) that measures whether the deviation was positive or negative. This asymmetric ECM model is given below.

$$E_t^i - E_{t-1}^i = \beta_1 (I_t^i - I_{t-1}^i) + \theta_1 (I_t^i - I_{t-1}^i) * DB_t^i + \beta_2 \varphi_{t-1}^i + \theta_2 (\varphi_{t-1}^i) * DB_{t-1}^i + \mu_t^i \quad (11)$$

Where $DB_t^i = 1$ if $\varphi_t^i > 0$ and 0 otherwise

The first term, θ_1 , allows for a test of whether the short-run response to a change in income is more elastic when revenues are above their long-run equilibrium.

The final step in constructing a residual-rule revenue elasticity for the property tax is to take the short-run elasticity estimates for expenditures and non-property tax revenues and combine them with school district property tax shares to complete the formula given in Equation (3.7).

I also estimate the short-run revenue elasticity of the property tax bases using assessed property values as the dependent variable in equations (3.8) and (3.11). This short-run elasticity represents the alternative model of property tax determination, in which the levy is expected to grow in proportion to assessed property value.

Data

This analysis is performed using data from Georgia school districts from 1998 through 2009. Each of the 159 counties in Georgia has a county school district. There are also several other independent school districts in Georgia that align with municipal boundaries. Because of the difficulty in obtaining comparable income data for the independent districts I have omitted them from this analysis.

The data for this study were obtained from several sources. Information on the actual receipts and expenditures of the school districts, as well as the property tax millage rates were obtained from the Georgia Department of Education. Information on the assessed values of the property tax bases was obtained from the Georgia Department of Revenue. Personal income data comes from the Bureau of Economic Analysis within the

U.S. Department of Commerce²⁵. All dollar amounts were inflation adjusted to 1983-1984 dollars with the Bureau of Labor Statistics South Region CPI Index.

I measure expenditures using the total operating expenditures for each school district for the fiscal year. Non-property tax revenue is all revenue coming from local, state or federal sources, minus ad-valorem property tax receipts. The largest source of school funding is the Quality Basic Education (QBE) grant program. This is a state aid program that is a combination of a foundation grant with an equalization grant. For further explanation of the specifics of Georgia's education funding programs see Rubenstein and Sjoquist (2003). The QBE program provides approximately one-third of primary and secondary education funding for county school districts over this period.

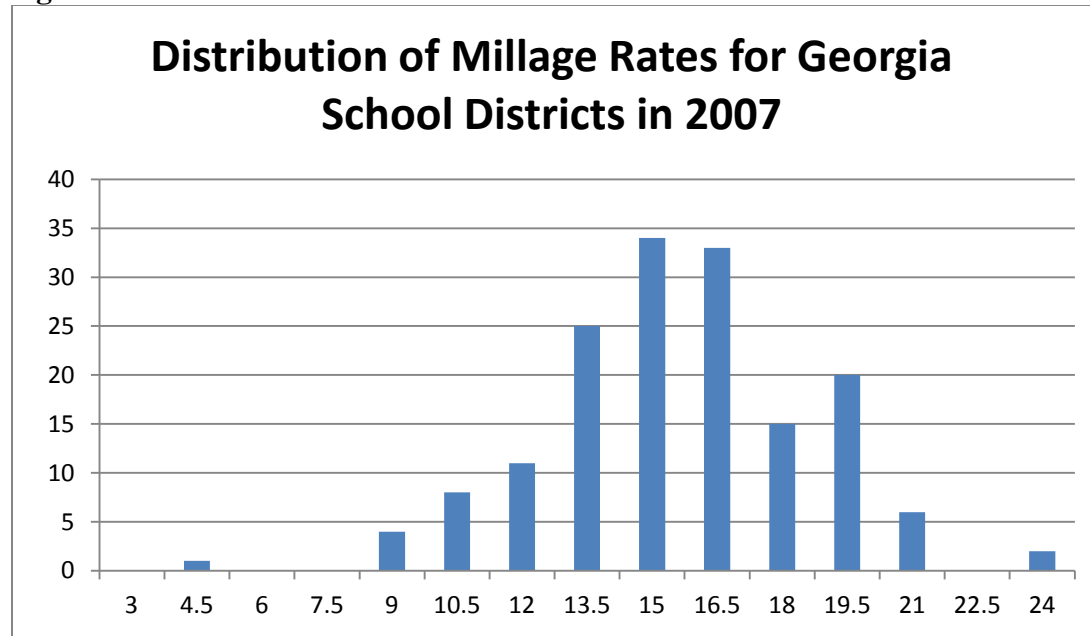
The property tax is the second most prominent source of education funding. It delivers approximately a quarter of school funds. One potential concern for this analysis is that the State of Georgia has placed a statutory cap on school district millage rates of 20 mills. This cap can be overridden, however, with the approval of local voters. If the cap were binding it would restrict the ability of local officials to apply the budget balancing rule. In 2007 three school districts had property tax rates that were higher than 20 mills and four counties had property tax rates that were at the limit. Figure 3.4 is a histogram of property tax rates for 2007. The average property tax rate for that year was 14.88 mills and the median rate was 14.942 mills. I therefore conclude that the statutory

²⁵ Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce

CA1-3 Footnotes <http://www.bea.gov/regional/docs/footnotes.cfm?tablename=CA1-3>
Regional Economic Information System

limit is not a significant enough deterrent to raise the tax rate above 20 mills that it significantly affects the distribution of the tax rates.

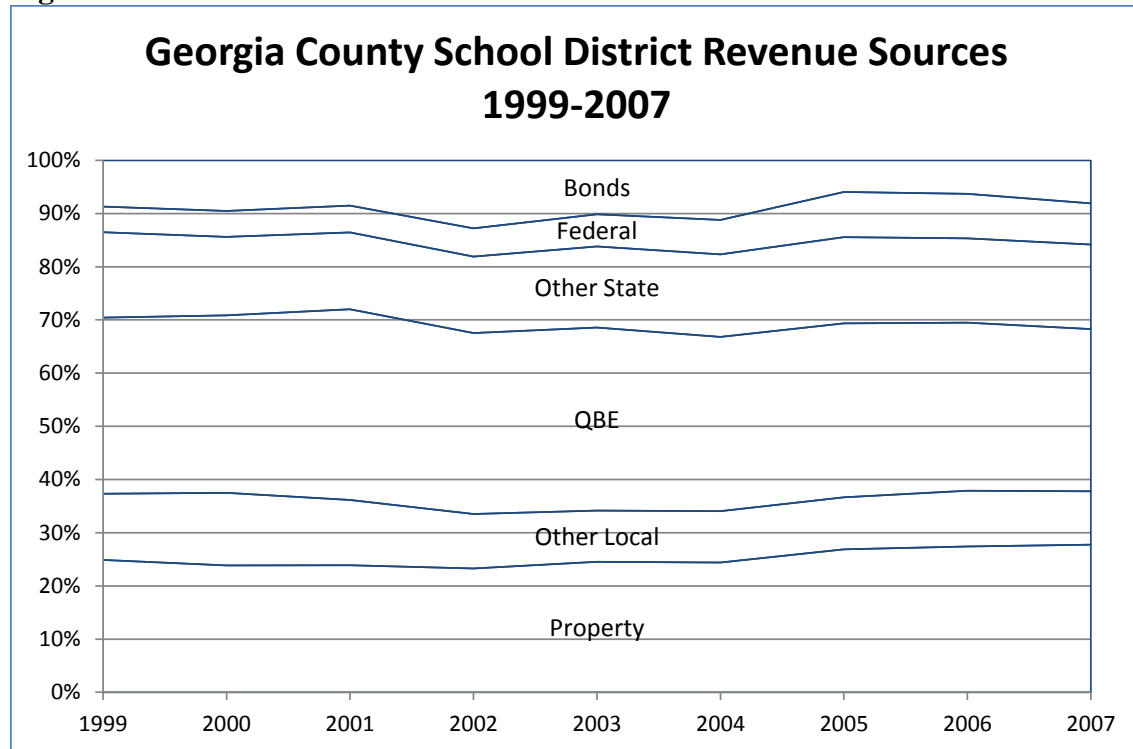
Figure 3.4



Aside from the property tax and the QBE grants, school districts in Georgia rely on a variety of other revenue sources. Additional local own-source funding comes from the Local Option Sales Tax, fees from the sale of breakfasts, lunches and textbooks, appropriations from city or county governments, tuition charges for students from outside the school district and local fundraisers. Some local school districts also receive revenue from additional sales taxes on top of the LOST. The State provides additional revenue on top of the QBE grants. These funds come from lottery receipts, nutrition grants, and ‘on behalf’ payments that go to employee benefit systems. The federal government sends direct grants that fund nutrition programs as well as additional funding that is disbursed through the Georgia Department of Education. The final revenue stream comes through miscellaneous financial sources such as the issuance of bonds and the sales of fixed

assets. Figure 3.5 displays the aggregate revenue shares from each source from 1999-2007.

Figure 3.5.



Long and Short Run Elasticity Estimates

The discussion of the estimation results is divided into two sections. The first part will present the estimation of the residual-rule elasticities. The latter part discusses the naïve model of property tax determination in which the levy grows in proportion to the property tax base.

Residual-Rule Elasticity Estimates

In this section I will first discuss the income elasticity estimates for expenditures and non-property tax revenues. I then discuss the residual-rule computation of the income elasticity of the property tax.

Table 3.2 provides a summary of the long and short-run elasticity estimates obtained from Equations 3.8, 3.10 and 3.11. This table displays the income elasticity estimates for expenditures and non-property tax revenues – the two sets of income elasticities needed to compute the budget-balancing version of the property tax income elasticity. This table also displays the income elasticities for the property tax base which are used for the alternative model. These estimates are average elasticities for all county school districts in Georgia. Both expenditures and non-property tax revenues exhibit income elasticities close to unity, with expenditures being slightly more income sensitive than non-property revenues. The value of 0.855 for the long-run non-property tax revenue revenue-income elasticity is close to similar long-run elasticity estimates for sales tax receipts reported by Holcombe and Sobel (0.691) and by Bruce et. al (0.811). Both of the long-run estimates are statistically significant. I calculated 95% confidence intervals for both long-run elasticity estimates and found that the difference between the two estimates is statistically significant as well. Table 3.3 presents greater detail on the estimated coefficients from the long-run regressions.

I estimated both the symmetric and asymmetric specifications for the short-run elasticities. These are given in Table 3.4. The symmetric variant of the short-run expenditure-income elasticity yielded an estimate of 0.765. This short-run expenditure elasticity is slightly lower than the long-run elasticity, suggesting that school district spending is less-sensitive to immediate income shocks than the overall growth trend, but the difference between the elasticities is not statistically significant. Allowing for an asymmetric response, expenditures exhibit short-run income elasticities of 0.641 when below the long-run average and 1.008 when above the average. Both the above and

below estimates are statistically significant and therefore are evidence of an asymmetric response. Changes to the level of public school spending appear to be more responsive to changes in income in years that spending is above its long-run equilibrium.

Table 3. 2 Summary of Estimated Income Elasticities

	Equation	Mean	T Statistic
Expenditures Elasticities			
Long-run Expenditures elasticity	(8)	0.952*	(40.24)
Short-run Expenditures elasticity (symmetric)	(10)	0.765*	(3.74)
Short-run Expenditures elasticity above equilibrium	(11)	1.008*	(3.54)
Short-run Expenditures elasticity below equilibrium	(11)	0.641**	(2.59)
Non-Property Tax Revenue Elasticities			
Long-run Non-Property Tax Revenue elasticity	(8)	0.855*	(52.68)
Short-run Non-Property tax elasticity (symmetric)	(10)	0.324+	(1.97)
Short-run Non-Property tax Elasticity above equilibrium	(11)	0.173	(0.76)
Short-run Non-Property tax Elasticity below equilibrium	(11)	0.412+	(1.823)
Alternative Model – Property Tax Base Elasticities			
Long-run Property Tax Base elasticity	(8)	0.950*	(53.41)
Short-run Property tax elasticity (symmetric)	(10)	0.377*	(3.94)
Short-run Property Tax Base elasticity above equilibrium	(11)	0.875*	(6.41)
Short-run Property Tax base elasticity below equilibrium	(11)	-0.234+	(-1.91)

The short-run non-property tax revenue income elasticity is less-than half of the long-run elasticity. The symmetric estimate is statistically significant and indicates that a one-percent increase in personal income is associated with a 0.324 percent increase in revenues. The asymmetric elasticity is not statistically significant when revenues are above their long-run average. One factor that may explain the short-run stability of non-property tax revenues is the large portion of school funding that comes from the state

QBE program. A portion of the grant program designed to provide a foundation level of funding that reflects the cost of providing an education. Although this cost should only be affected by the long-run rate of income growth, the state legislature sets annually in the budget what the cost assumptions will be. This allows legislators to take into account the budgetary impact of the cost assumptions and adjust the level of QBE funding according to economic conditions (Ross Rubenstein and Sjoquist 2003).

Table 3.3 Long-Run Revenue Income Elasticity Estimates

	(1)	(2)	(3)
VARIABLES	Expenditures	Non-Property Tax Revenues	Net Assessed Property Value
Log of I	0.952* (40.243)	0.855* (52.688)	0.950* (53.409)
First Lag of ΔI	-0.722+ (-1.792)	-1.263* (-5.021)	0.460 (1.214)
Second Lag of ΔI	-2.366* (-6.560)	-0.843* (-3.394)	-0.307 (-0.921)
First Lead of ΔI	-0.237 (-0.710)	-0.428+ (-1.836)	0.968* (3.211)
Second Lead of ΔI	-0.158 (-0.421)	0.198 (0.778)	0.521 (1.593)
Constant	5.288* (18.430)	5.988* (29.964)	8.004* (36.104)
Observations	1,260	1,237	1,270
R-squared	0.902	0.939	0.917
Robust t-statistics in parentheses			
* p<0.01, ** p<0.05, + p<0.1			

I have computed short-run property tax income elasticities using the estimates of the short-run income elasticities of school district expenditures and non-property tax revenues. These are computed by applying Equation (3.7) to the estimates.

It was necessary to make an adjustment to the calculation of the property tax share (S) due to an influential number of records with missing or erroneous data on property

tax receipts. Rather than using the data on actual property tax receipts, I computed the statutory levy, which is the amount that the local officials legally obligate taxpayers to pay when they set the tax rate. The statutory levy is calculated by multiplying the property tax rate by the net assessed property value. The difference between the statutory levy and actual receipts is the uncollected property tax for the year less any receipts from previous years. It could be argued that using the statutory levy is a superior measure for the tax share calculation as it is the actual policy target of local officials while actual receipts are an uncertain quantity.

Table 3.4 Short-Run Revenue Income Elasticity Estimates

VARIABLES	Symmetric Error Correction Models		Asymmetric Error Correction Models	
	Expenditures	Non Property Tax Revenue	Expenditures	Non-Property Tax Revenue
ΔI	0.765*	0.324+	0.641**	0.412+
	(3.747)	(1.970)	(2.599)	(1.823)
ECT	-0.154*	-0.260*	-0.239*	-0.212*
	(-9.977)	(-9.078)	(-8.512)	(-5.469)
Above LR Average* ΔI			0.367	-0.238
			(1.111)	(-0.763)
Above LR Average*ECT			0.150*	-0.078
			(4.618)	(-1.402)
Constant	0.091*	0.021*	0.078*	0.027*
	(19.578)	(3.631)	(13.516)	(4.095)
Observations	1,259	1,234	1,259	1,234
R-squared	0.081	0.130	0.094	0.133
Robust t-statistics in parentheses				
* p<0.01, ** p<0.05, + p<0.1				

For S I use the average ratio of the property tax levy to total revenues across the 159 county school districts between 1999 through 2007. In order to compute a measure

of central tendency for the computed property tax elasticity it is necessary to account for the algebraic properties of random variables.

- $ax + b \sim N(a\mu + b, a^2\sigma^2)$
- $x_1 + x_2 \sim N(\mu_{x_1} + \mu_{x_2}, \sigma^2_{x_1} + \sigma^2_{x_2} + 2\rho\sigma_{x_1}\sigma_{x_2})$

I treat the mean property tax share as a scalar since it is an observed characteristic of the population of counties over this period. I assume that the estimates of the elasticities for expenditures and non-property tax revenues are independently distributed normal variables. The mean of the calculated property tax elasticity is simply computed by substituting the value of S and the estimates of $\epsilon_{BE,I}$ and $\epsilon_{NP,I}$ in to Equation (3.7). I calculated the variance by taking the variances of the estimates of $\epsilon_{BE,I}$ and $\epsilon_{NP,I}$ from the variance-covariance matrices of their respective regression equations and calculating the following value:

$$\frac{\sigma^2_{\epsilon_{BE,I}}}{S^2} + \frac{\sigma^2_{\epsilon_{NP,I}}}{S^2} + \sigma^2_{\epsilon_{NP,I}}$$

Table 3.5 displays the results of the computations. Two sets of elasticity computations were made using the symmetric and asymmetric elasticity estimates, respectively. Four elasticities can be computed using the asymmetric results because there are four possible combinations of the expenditure and non-property tax revenue elasticities depending on whether each value was above or below its long-run average. Only a single computation is made using the symmetric estimates.

The revenue-rule computations of the short-run income elasticity of the property tax are higher than the elasticity estimate for both expenditures and non-property tax revenues. The symmetric estimates yield an elasticity of 2.44 while the values generated

from the asymmetric estimates range from 1.51 to 4.18. The income elasticity computations are higher when either expenditures or non-property tax revenues are above their long-run averages. This suggests that the most active ‘residual rule’ adjustments to the rate tend to occur when revenues and spending are above their long-run trend and a downward adjustment is imminent.

Table 3. 5 Short-Run Income Elasticity Computations for the Property Tax Using the Budget Balancing Rule

Symmetric Short-Run Elasticities			
	Mean	2.44	
	Variance	1.61	
Asymmetric Short Run Elasticities			
		Non-Property Tax Revenue	
Expenditures		Below	Above
Below	Mean	1.51	2.42
	Variance	2.62	2.65
Above	Mean	3.27	4.18
	Variance	3.09	3.12

Property Tax Base Elasticities

I have estimated the long and short-run income elasticities of assessed net property values for all county school districts in Georgia and the results are displayed in Tables 3.2, 3.3 and 3.6. These estimates are used to generate a comparison set of property tax revenue projections in the following section. The elasticity estimates themselves are of some interest, however. The long-run income elasticity of assessed property values is nearly the same as the expenditure income elasticity and greater than the non-property tax revenue elasticity. This result is contrary to the conventional understanding that growth in the assessed value of the property tax base is slower than

the rate of income growth. If over the long run assessed values track income growth then there would be little need for regular rate adjustments to compensate for low long-run income-elasticities.

Table 3.6 Short-Run Elasticity Estimates for Net Assessed Property Value

VARIABLES	Property Tax Base	
	Symmetric	Asymmetric
ΔI	0.377*	-0.234+
	(3.937)	(-1.912)
ECT	-0.013	-0.045**
	(-1.558)	(-2.531)
Above LR Average* ΔI		1.109*
		(6.819)
Above LR Average*ECT		0.010
		(0.348)
Constant	0.060*	0.059*
	(20.241)	(14.118)
Observations	1,111	1,111
R-squared	0.016	0.051
Robust t-statistics in parentheses		
* p<0.01, ** p<0.05, + p<0.1		

The symmetric short-run elasticity appears to indicate that assessed values are relatively inelastic to immediate changes to income. Allowing for an asymmetric response reveals, however that when assessed values are above their long-run equilibrium the short-run response is only slightly lower (0.875) than the long-run elasticity. In contrast, when assessed values are below their long-run equilibrium they actually have an inverse relationship with income changes over the short-run. This large divergence in the short-run elasticities is likely influenced by the highly volatile housing market over the most recent recession and a relatively long delay in adjusting assessments to falling

housing prices. Assessments may have been just catching up with the rapid rise in property values over the middle of the first decade of the 2000's and were continuing to rise even as incomes were beginning to fall with the onset of the recession. Table 3.5 gives full details on the short-run estimates for the property tax assessments.

Post-Estimation

The objective of this post-estimation exercise is to generate two sets of predictions of the property tax levy and observe which model is more accurate. If the set of projections generated using the residual rule of property tax determination is a better predictor then this will provide empirical support for the argument that county officials are setting their levies in response to receipts from other revenue sources and their budgeted expenditures.

I calculate the revenue-rule elasticity ($\epsilon_{PT,I}$) using Equation (3.7) for each school district/year record with the estimates of $\epsilon_{BE,I}$ and $\epsilon_{NP,I}$ and the counties' property tax revenue share for the year (S). This is in contrast to the aggregate calculation of $\epsilon_{PT,I}$ I performed in the previous section that used the average value of S across all districts and years. After computing $\epsilon_{PT,I}$ for each county using Equation (3.7) I calculate the predicted property tax levy according to the residual rule using the following formula:

$$\text{Residual Rule Levy}_t = \exp\left(\epsilon_{PT,I} * (\ln(I_t) - \ln(I_{t-1}))\right) * \text{Levy}_{t-1} \quad (3.12)$$

I then take the difference between the projected levy at time t with the actual levy for that time period. I divide this difference by the current period levy to get the percent difference of the projection from the levy. For the comparison, I generate a predicted levy using the assessed property tax base income elasticity as follows:

$$\text{Comparison Levy}_t = \exp\left(\varepsilon_{Base,I} * (\ln(I_t) - \ln(I_{t-1}))\right) * \text{Levy}_{t-1} \quad (3.13)$$

I compute the percent difference of the comparison levy from the actual levy in the same fashion as I did for the residual-rule levy.

The projections were computed for the years 2000 through 2007. Table 3.7 presents the mean, median and confidence intervals for the percent differences of the projections from the actual levies. The projections were computed using both the symmetric and the asymmetric sets of elasticity estimates. The point-values for the average difference between the predicted value and the actual value are smaller for the residual-rule projections using both the symmetric and the asymmetric approaches. The difference in means is statistically significant; therefore on average the residual rule model provides a better fit to the actual levies than the comparison model.

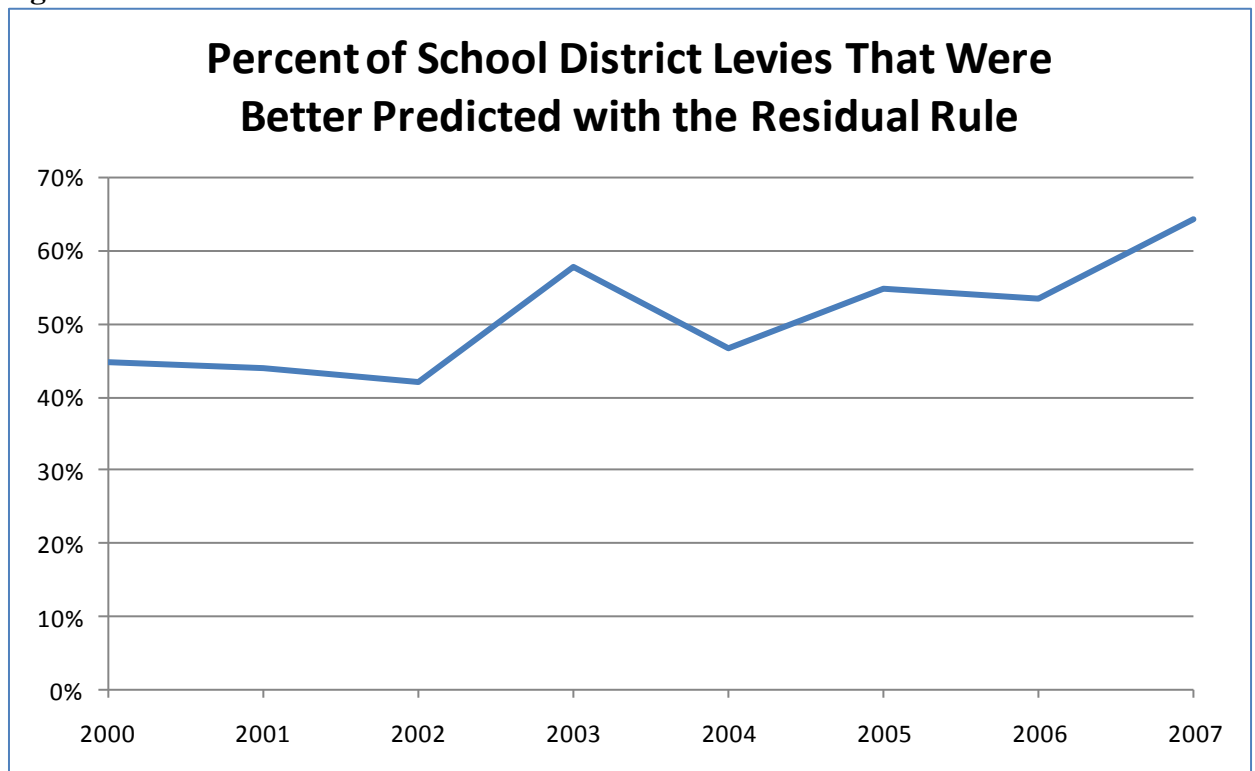
Table 3.7 Years of Superior Fit Using the Residual Rule Model, by County

Years	Count of Districts	
	Symmetric	Asymmetric
0	3	3
1	12	12
2	22	26
3	32	36
4	25	22
5	22	21
6	20	24
7	18	13
8	5	2

Looking at the average difference across all counties obscures much of the unit-level variation in the performance of the predictors. Another way to look at the projections is to examine the frequency with which the residual-rule projection fares better than the assessment-driven model. Figure 3.5 displays the annual percentage of

school district levies that were more accurately predicted using the residual rule model. Over the eight years displayed the residual rule was a better predictor for more than half of the counties for only four years. There appears to be a slight upward trend in the percentages, suggesting that the residual-rule approach to setting the property tax rate may have been more prevalent in the later half of the time series.

Figure 3.6.



One important piece of information that the annual percentages do not convey is whether it is the same districts every year following the residual rule, or whether having a superior fit is more randomly distributed across the district/year units of observation. I investigate this issue by counting the number of years for each school district that the residual rule model gave a better fit and then examining the frequency of the counts across the population of school districts. Table 3.8 gives a frequency of the year counts for both the symmetric and the asymmetric projections. Looking at frequencies from the

symmetric set of estimations, I observe that 5 counties had a better fit with the residual rule model over all eight years of the projection period. Nearly 41% of counties were more accurately fit by the residual rule model for five or more years of the period. This suggests that these counties levy-setting behavior appears to be more accurately described by the residual rule model of property tax determination, rather than an income-adjusted tax base model. The projections from the asymmetric model depict a similar pattern, though those projections are also slightly less accurate predictors.

Table 3.8 Comparison of Projection Accuracies

	Mean	Std Dev	Median	Lower 95% CL For Mean	Upper 95% CL For Mean
Symmetric Elasticities					
Residual-Rule Projection	0.013	0.115	0.017	0.007	0.02
Comparison Levy Projection	0.064	0.074	0.052	0.06	0.068
Asymmetric Elasticities					
Residual-Rule Projection	-0.002	0.138	0.01	-0.009	0.006
Comparison Levy Projection	0.064	0.074	0.052	0.06	0.068

The next question is whether the districts that receive a better fit through the residual rule model have different characteristics than the other districts. Table 3.9 provides summary statistics for all school districts both in aggregate and broken out by whether the model gave a superior fit for 5 or more years. This table shows that those school districts with five or more years of superior fit have, on average, a higher income per capita and have a higher population density than the districts with a poorer fit. Additionally, the better fit districts also have larger property tax shares. Returning to Table 3.1, which describes how changing S will affect $\mathcal{E}_{PT,I}$, helps describe what the

difference in the tax share means. When the expenditure income elasticity is greater than the non-property tax revenue elasticity then a larger S will reduce the magnitude of the changes to the property tax needed to adhere to the residual rule. So the districts with the largest tax shares would be making proportionally smaller changes to their levies in response to expenditures and other revenues. For jurisdictions with a smaller S , the political cost of making the proportionally large changes to their levies needed to adhere to the rule may be too high. It makes sense then that the districts with the lowest political cost of following the rule exhibit fiscal behavior that is better predicted by this model.

Table 3.9 Demographics by Model Fit

	N Obs	Variable	Mean	Median	Lower 95% CL for Mean	Upper 95% CL for Mean
All Districts	159	Population Density	189.4	63.35	129.07	249.72
		Income Per Capita	\$27,896	\$27,034	\$27,050	\$28,741
		Property Tax Share	23.0%	21.0%	22.0%	25.0%
Four or Fewer Years	94	Population Density	85.71	37.63	42.72	128.69
		Income Per Capita	\$25,847	\$25,127	\$24,977	\$26,717
		Property Tax Share	19.0%	18.0%	18.0%	21.0%
Five or More Years	65	Population Density	339.35	151.56	212.15	466.55
		Income Per Capita	\$30,859	\$29,580	\$29,487	\$32,231
		Property Tax Share	29.0%	27.0%	26.0%	33.0%

Final Discussion

The ability to identify empirically which local governments implement the residual rule of property tax determination raises other questions that should be the topic of future research. The first step would be to move from identification of the policy to

evaluating its effectiveness and overall impact on local fiscal structures. The underlying objective of following the residual rule is to balance the budget by offsetting cyclical shocks to other revenue sources. It would be interesting to investigate whether local governments that follow this approach have a more stable fiscal structure in aggregate. Is there a tradeoff between a more stable overall structure and a predictable property tax levy? One way to address this would be to construct a panel over a longer time period so that the elasticities could be estimated for each jurisdiction individually. Then the residual-rule property tax elasticity could be used in a second stage analysis as an explanatory variable for a regression on overall revenue stability. This would be one potential approach to evaluating the policy's effectiveness in promoting local stability.

Another interesting question is how continued revenue diversification would affect the predictability of the property tax in jurisdictions that use this approach to setting their levies. In the case of Georgia, where the short-run expenditure elasticity was higher than the non-property tax revenue elasticity, further reductions in S would increase the size of the changes in the levy needed to follow the residual rule. This may lead jurisdictions to abandon the rule, potentially losing the ability to smooth the performance of their overall revenues, or continue with the rule and further reduce the predictability of the property tax at an unknown political cost. On the other hand, there may be jurisdictions where non-property tax revenues are more income elastic than expenditures which could cause a reduction in S to actually stabilize the property tax levy.

It may also be interesting to further investigate how the tools of investment management may be used to account for characteristics of the property tax within a portfolio of revenue sources. Gentry and Ladd's (1994) critique that the property tax

defies the traditional portfolio approach to modeling revenue stability may be weakened if the structure of the residual rule can be incorporated into the characteristics of the revenue portfolio. The model presented in this paper provides an approach to predicting the pattern of rate changes enacted by local officials over economic cycles. Incorporating this information into a portfolio model may produce revenue structure recommendations that improve the overall stability of local finances.

Within the context of public financial management, this essay also identifies a policy regime that local jurisdictions lose access to when they implement property tax limitations. As discussed earlier, it is not possible to follow the residual rule when tax rates and overall levies are capped. The residual rule is one of the channels that the tradeoff between predictability and stability may be made. Future research on whether the residual rule increases overall stability will highlight exactly what tax-limited jurisdictions are giving up.

CHAPTER IV

CONTRACT DESIGN FOR EXTREME OUTSOURCING: A CASE STUDY OF SANDY SPRINGS, GA

Introduction

The rise of the contract city as a new form of municipal governance presents many thorny issues for the theory and practice of public management. The contract city model is an extreme form of municipal outsourcing in which the city enters into comprehensive private partnerships for the production of the majority of municipal functions. On the practitioner side, cities adopting this model of service delivery see the role of the city manager shift from administering public resources to monitoring and enforcing contracts (Prager 2008). For researchers interested in the theory of public contract management, this form of government challenges the conventional approach to studying internal vs. external production decisions. The question shifts from whether a single service function is a candidate for external production (see for example Levin & Tadelis, 2007), to whether a large set of service delivery and managerial functions can be outsourced at once. A key difference between the two models of governance is that rather than evaluating the economic merits of outsourcing each function individually, contract city managers choose the overall service delivery regime and contract for an array of services. Additionally, limited competition in the market for the private production of municipal functions, forces contract city officials to evaluate bids from a

small set of potential service providers who are willing and able to undertake the production of the bulk of municipal functions.

In this essay I investigate the implications that the contract city model of governance has for contract management. It raises questions such as: does the scope of this type of public-private partnership facilitate interactions between outsourced functions that create greater contract management problems than would have otherwise existed if the services were provided by different partners? Are there synergies among certain municipal functions that when they are outsourced together increase the difficulty of contract management by creating the potential for conflicts of interest? Does the design of the actual contracts between contract cities and their private partners reflect the unique managerial challenges that could arise with this scale of outsourcing?

I investigate these questions through a case study of the initial contracts signed by the city of Sandy Springs, Georgia with its primary contractor, the private firm CH2M Hill. I identify three key categories of municipal functions that are interrelated and, when outsourced to a single private partner, create the potential for a conflict of interest. These three functional categories are: 1) the production of direct services, 2) the creation of managerial and financial information and 3) administrative and control functions. My analysis of the contract documents indicates that combining this broad scope of services in a single public-private partnership creates the potential for “negative synergies” which raise the cost of monitoring and managing contractor performance above what would be required if the functions were individually outsourced to separate contractors. I also identify beneficial structures that can counteract some of the adverse incentives created by the scope of the contracts. These features would not be present in the contracts

associated with traditional municipal public-private partnerships that do not exhibit the same scope of outsourcing. The identification of these interrelationships between municipal functions can inform the design of contracts, especially when determining how contract cities should allocate functions across various private partners.

This essay begins with a review of the literature covering the local government outsourcing and the contract city model of public management. Section III introduces the city of Sandy Springs and gives some background on how its public-private partnership with CH2M Hill was developed. Section IV discusses the textual analysis approach that I employ to examine the contracts for services. Section V presents the findings from my analysis and Section VI offers the conclusions and policy recommendations from my analysis.

Before commencing I must emphasize that this analysis is confined to the incentives that are embedded within the contracts and the potential behaviors that they may encourage. In no way does this study examine any actual behaviors on the part of CH2M Hill and does not imply that any action has at any time been taken in conflict of interest with respect to the City of Sandy Springs. The objective of this analysis is to inform both public and private partners on some of the potential pitfalls in this new form of municipal administration. I also hope to provide information of academic value on how the principal-agent relationship operates within the context of the contract city model of governance.

The Contract City

The contract city is an alternative model of municipal governance that is characterized by the outsourcing of nearly all city functions. Services in contract cities

are either produced through arrangements with other nearby local governments, as in the case of Highlands, California (see Ni, 2010), or through public-private partnerships with for-profit firms and non-profit organizations. Contracts may be secured with multiple partners or with a single firm that provides the bulk of services and may employ multiple sub-contractors. The key distinction between a contract city and other municipalities which engage in outsourcing is the scale of this activity. Bradbury and Waechter (2009) describe it as an “all but the top” approach to outsourcing where merely a few key managerial positions and their support staff remain as direct city employees.

Current research into contract cities has identified a variety of ways in which this form of service delivery challenges much of the framework for understanding contract management in cities which only outsource a small share of their functions. One key difference is that the nature of the work involved in administering the operation of a city changes when all service production functions are performed externally. Prager (2008) finds in his analysis of the city of Weston, Florida that the role of a contract city manager is “monitoring contracts and taking measures in those instances when a contractor’s performance fails to meet expectations.” In contrast, the city manager’s role in a traditionally structured city primarily consists of the direct management of human and physical resources.

Another key feature of many contract cities is that they adopted this model at the time of their incorporation, rather than shifting to it from a traditional own-source production regime. The city of Highlands, CA was designed from its inception to obtain essentially all of its services through contracts with other nearby local governments (Ni 2010). Similarly, the cities of Sandy Springs, GA and Weston, FL contracted with

private firms and with other local governments for the entirety of their services at the time of their incorporations.

The decision-making process for whether to pursue a self-producing or contract city service production regime is categorically different than the traditional make-or-buy decision that is studied in the existing contracting literature. The traditional approach applies transaction cost economics to determine whether it would be efficient to outsource an individual city function (e.g. Brown & Potoski, 2003b). Levin and Tadaelis (2007) follow this line of research as they test their hypothesis that there are economies of scope for contract management. They estimate that “a given service is 3-5% more likely to be privatized if a city privatizes one additional other service.” While scope economies may encourage cities to shift gradually into contract-intensive production regimes, this framework is based on a marginal analysis of each service function and does not explain why newly formed cities with no history of contract management experience would outsource essentially their entire operations to private partners.

Bradbury and Waechter identify the role of ideology as an important factor behind the initial decision to employ a contract city model during the incorporation of Weston, Florida. Rather than performing a rational analysis and calculating the relative costs of the make-or-buy alternatives for all service areas, the decision was influenced by an underlying belief that outsourcing would generate cost savings and improve operations. The authors report that after several years of operation some functions were eventually shifted to internal production, such as the negotiation and monitoring of existing contracts with other private partners. By shifting these functions to in-house production, the city of Weston responded to the actual costs of contract management for these

administrative functions and found that it would be more efficient to make a slight movement away from their prior commitment to a pure contract city model. While ideology may play a strong role during the period leading up to the creation of a contract city, efficiency and pragmatism can, over time, counterbalance ideological commitment to a single model of governance.

A recent theme in the contract management literature been the tension between "hollow state" arguments and the finding that local governments can outsource contract administration to increase overall managerial capacity. A dialogue has occurred between the leading authors behind both arguments, with Milward and Provan developing the former and Brown and Potoski pursuing the latter. Milward and Provan (2000) summarize the key findings and insights they obtained from multiple studies they had performed during the prior decade. Over the course of their research program they develop a concept of a "hollow state" to indicate the "degree of separation between a government and the service it provides." Their research highlights the potential for principal-agent problems to arise between the government and its contractors and that the government faces the risk of losing legitimacy if it appears to be trying to shift the responsibility for adequate service provision to third parties.

One of Milward and Provan's insights is that contract management is most successful when the principals are also engaged in the production of some services. This allows the principal to obtain some independent information on the costs of service production and thus deters agents from colluding on pricing. This insight appears to weigh against the viability of the contract city model as no direct production of services would occur internally. Furthermore, as the contract city in most cases is implemented in

new municipalities, there would be no historical knowledge of service costs that would be carried over from the previous regime.

The extent of outsourcing in a contract city introduce new problems that are not considered in the "hollow city" framework. Milward and Provan describe an extreme case of a "hollow state" as one that has contracted out "all its production capability to third parties, perhaps retaining only a systems integration function that is responsible for negotiating, monitoring, and evaluating contracts" (p. 362). The contract city, as it has been implemented in at least two cases, goes even further than Milward and Provan's extreme case, as the negotiating, monitoring and evaluating functions have either been outsourced, or the contractor gives support to these activities.

While municipalities with contract city models of governance would appear to be at great risk of the governance issues associated with the "hollow state", other research suggests that a key feature of local outsourcing has been omitted from Milward and Provan's studies that would allow local governments to increase their management capacity. Brown and Potoski (2006; 2003a) respond to the "hollow state" by pointing out that studies up to that point had failed to acknowledge that municipalities can successfully outsource the functions of bidding for contracts, negotiating with and selecting vendors, and evaluating contractors' performance. Brown and Potoski argue that studies that omit the managerial functions delivered through private partnerships obtain biased assessments of governments' total administrative capacity. Their analysis of survey data from municipalities in Ohio finds that cities that outsource contract management services perform at least as many contract monitoring activities as those that perform all contract management functions internally. The key issue for the contract city

raised by this research is whether it is feasible to design a contract or set of contracts that will include the appropriate contract management functions for all service production functions. There is some reason to be skeptical that this is possible. In their more recent paper Brown and Potoski (2006) note that their findings are restricted to waste management, a function with easily observable outcomes. It is likely easier to design a contract for a private-partner to monitor another third party's delivery of this service. It is not clear whether outsourcing contract management functions for less tangible services would result in similar success.

This paper examines the consequences for contract cities of outsourcing less-observable function areas such as forecasting economic conditions, advisement on capital project planning, procurement, contractor monitoring and accounting. The outputs of these functions are intangibles such as providing information on the future service needs of the city or maintaining a well-operated fiscal management system. It would likely be more difficult, therefore, to assess the quality of a third party's production of these services and even more so for the city to outsource the monitoring of these functions to another private partner. Weak monitoring of these information-based functions creates another, potentially more serious problem -- the subversion of this information to create a conflict of interest. As highlighted by Prager and by Bradbury and Waechter, contract cities may receive relatively few bidders for their contracts, resulting in some cases where the majority of city functions have been outsourced to a single principal contractor who then employs sub-contractors for individual functions. If the city must make decisions based on information created by its own contractors, then there is potential for that information to be manipulated by the contractor in order to serve its own interests in the

service-production segments of the contract. The subsequent sections of this paper analyze the structures of the contracts between the City of Sandy Springs and its primary contractor in order to identify these types of potential weaknesses.

Sandy Springs, Georgia

Prior to its incorporation on December 1, 2005, Sandy Springs consisted of the unincorporated region of Fulton County bordering immediately to the north of the city of Atlanta. The county government provided municipal-type services. These included Fire, Police, Parks and Recreation and Environment and Community Development activities. Fulton County operated a special service district fund through which it financed municipal services to unincorporated areas. Revenues for the fund were obtained through an annual property tax levy on the unincorporated districts and through fees and charges for services²⁶.

Sandy Springs was primarily made up of commercial and residential properties and had an estimated population of less than 90,000 residents. It covers an area of approximately 36 square miles on the northern tip of Fulton County and lies within the greater metropolitan region of Atlanta, GA. Sandy Spring's racial composition is similar to national proportions, though in comparison to the rest of Fulton County it is relatively less diverse. According to the 2009 ACS population estimates (*2005-2009 American Community Survey*, 2009), the population of Sandy Springs is 78.5% white, 13.0% Black or African American, 4.1% Asian and the remainder belonging to other racial groups. Also, 13.1% of the population is estimated to identify as Hispanic or Latino. In contrast,

²⁶ Notes to the Financial Statements, Fulton County CAFR FY 2005, pg 32

Fulton County as a whole is 47.8% White, 42.9% Black or African American, 4.1% Asian and the remainder identified as either other or two or more races.

Sandy Springs is also more affluent than Fulton County as a whole. The median household income of Sandy Springs is \$76,477 and for Fulton County it is \$58,573. The ACS 2009 estimates also report that the median value of owner-occupied homes in Sandy Springs was \$452,700 and \$250,800 for the rest of the county. The unemployment rate shows the same pattern with a 3.7% rate in Sandy Springs and 8.4% for the entire county.

Several factors increased local support for incorporating the Sandy Springs area. In the early 1970's the city of Atlanta attempted to annex Sandy Springs. A citizen's group called the Committee for Sandy Springs was formed to resist annexation and pursue incorporation as a means of maintaining local control over services and taxation. The primary obstacle to forming a new city, however, was a Georgia requirement that both houses of the state legislature must pass bills to authorize the creation of new municipalities. Over a 30-year period the Democrat-controlled legislature resisted giving approval to form a new city in Sandy Springs. The Committee for Sandy Springs acted as the key advocacy group supporting municipal incorporation over this entire period.

While resisting annexation was the initial objective of the incorporation movement, over time another issue came to draw even more support to the side of incorporation. According to Porter's account, the administration of municipal-type services to the Sandy Springs area by Fulton County was unresponsive and inefficient. He describes a historical trend in which votes by the Fulton County Board of Commissioners consistently fell against the interest of the Sandy Springs area (Porter 2006, 109–111). He also claims that the Fulton County government neglected the traffic control and road

maintenance needs of Sandy Springs (Porter 2006, 58). Part of the rhetoric supporting a new city was that self-governance would be more responsive and efficient than administration through the county government.

In 2004 control over the legislature shifted to the Republicans and soon a bill was passed and signed by the Governor giving authorization to form the new city. The bill gave Sandy Springs an extremely short time frame to develop and implement an incorporation plan. The bill was signed into law in April of 2005 giving authorization to form the new city, subject to citizen approval, on December 1 of that same year. On June 6th a local referendum for residents of the Sandy Springs area passed with 94% of the votes in support of incorporation.

Once the legal authority to create the new city was given, the Committee for Sandy Springs transitioned into the key organizing body that planned the structure of the new city government. The Committee appointed Oliver Porter as an “Interim City Manager²⁷” on a volunteer basis and also formed several volunteer task forces to develop plans for the future city to perform its essential services and functions (Porter, 2006 p. 38). The key responsibility of each task force was to identify for its respective service area whether services should be produced through in-house production, contracts with Fulton County, contracts with other nearby local governments, or outsourced to a private partner. Table 1 depicts which production alternatives were used for each functional area.

²⁷ The Interim City Manager was a volunteer position that existed prior to the incorporation of Sandy Springs. Porter agreed not to run for office or accept a paid position in the city government upon incorporation upon accepting this voluntary appointment (Porter, 2006, p. 38)

Table 4.1 Initial Service Production Methods of Sandy Springs, GA

Alternative	Service/Function
Internal Production	<ul style="list-style-type: none"> • Mayor • City Council • City Manager • Courts • City Clerk • Clerk of Court • Office of City Attorney
Contract with Current Government (Fulton County)	<ul style="list-style-type: none"> • Police (6-month contract) • Fire (6-month contract) • E911 (6-month contract) • Sewer
Contract with other local governments	
City of Roswell, GA	<ul style="list-style-type: none"> • Jails
City of Smyrna, GA	<ul style="list-style-type: none"> • Enhanced Library Service
City of Atlanta, GA	<ul style="list-style-type: none"> • Water
Private Partnerships	<ul style="list-style-type: none"> • Accounting • Finance • Information Technology • Administration • Human Resources • Administrative support of: Courts, Police and Fire. • Parks and Recreation • Community Development (Planning, Zoning and Permitting) • Public Works • Transportation • Solid Waste (one-year nonexclusive contract, evolving into franchises)

(Porter 2006, 60, 116–118)

The exact timeline for deciding to adopt the contract city model in Sandy Springs is not clear from Porter's book, though he does note that he first heard about the city of Weston, FL in early 2005. As discussed earlier in this paper, Weston, FL is one of the earliest adopters of the contract city model of governance and was the subject of Prager's (2008) case study. Porter, as the Interim City Manager of Sandy Springs, made an

exploratory visit to Weston or order to learn about their implementation of the contract city model (Porter 2006, 10–11). Following this visit the city manager of Weston and representatives from that city’s two principal contractors travelled to Georgia to make a presentation to the Committee for Sandy Springs on the operation of a contract city.

Soon after that presentation, Committee for Sandy Springs decided to pursue a contract city model of governance for the new municipality. The committee members compiled a list of potential firms that might have the capacity to deliver services to the as-yet non-existent city. They then sent these firms a “Prequalification Letter” which asked two key questions. First, it identified a variety of municipal service areas and asked firms to indicate whether they had the capacity to deliver any of them. It also asked prospective firms to provide a reference from a similar city or other entity for which the firm was already providing a comparable service. Second, it asked whether “the firm would consider making major implementation expenditures before a contract, or even a handshake, could be concluded” (Porter 2006, 124). This second requirement was necessary because the Committee had no authority to enter into a contract or informally commit to any binding agreement until the city had formally incorporated, which would not occur until December 1, 2005. Therefore the processes of issuing requests for proposals and the subsequent bidding and negotiating of contract would occur without actual guarantees of the future city council agreeing to the contract after the city had formally incorporated. This limited the number of firms that were interested in bidding for contracts once the requests were issued by the Committee. Based on the responses to the letter the Committee found that the interested firms could be split into those that could provide technical services and those offering administrative services.

The Committee therefore decided to issue two separate RFPs for technical and administrative services. Table 2 depicts this division.

Table 4.2 Contents of the Initial Requests for Proposals by the Commission for the City of Sandy Springs

Services Included in Each Request For Proposal	
RFP #1 “Administrative”	Administrative, Financial Services, Emergency 911, Physical Plant, Motor Vehicle, Staffing, Purchasing, Procurement, and Contracting Services
RFP #2 “Technical”	Public Works, Transportation, Streets, Right-of-Way, Facilities, Parks and Recreation, Capital Improvements, Planning and Zoning, Inspections, Code Enforcement, Permitting, Purchasing, Procurement, and Contracting Services

Source: Contract, RFP #1; Contract, FRP #2

Although the Committee for Sandy Springs and its sub-committees were responsible for the design of the RFPs, the actual RFPs were issued by a separate entity: the Governor’s Commission for Sandy Springs (GCSS). This was a five-person appointed commission established on June 24, 2005. This was done primarily because the volunteer Committee could have potentially been held liable for the costs of the companies responding to the RFP (Porter, 2006 pp. 134). Porter indicates that four of the five commissioners appointed by the governor had not been active members of the Committee for Sandy Springs and that two of the members did not reside within the jurisdiction’s boundaries. The GCSS was, however, supportive of the Committee’s work and agreed to sponsor the RFPs as initially prepared during their first meeting on July 29. By sponsoring the RFPs the GCSS became the entity responsible for evaluating the proposal submissions.

After sending out the prequalification letter, the Committee held a pre-proposal conference on August 14, 2005 so that firms interested in submitting proposals could obtain further information about the conditions of the agreement and the nature of services to be provided. Porter reports that 41 firms attended the conference. An additional feature of the conference was that it helped smaller firms unable to meet the full range of service requirement in either of the RFPs to match together in order to design collaborative proposals. Ultimately only one firm, CH2M Hill, submitted a proposal for the RFP for Administrative services and only three firms submitted proposals for the Technical services RFP, one of which was also CH2M Hill (Porter, 2006, p. 143-144).

The RFPs were evaluated by a team selected by the GCSS. Porter reports that “[f]ive members were residents of the community with experience in RFP procedure and in evaluation of bids. The sixth member was the County Manager of an adjacent county” (Porter p. 141). The proposals were evaluated using composite scores that gave equal weight to the following criteria: (1) Qualifications and Experience, (2) Previous Experience with Similar Services and Duties, (3) Start-up and Implementation Plan, and (4) Cost. The evaluation team received written proposals as well as oral presentations from all parties submitting proposals. Because only one firm submitted a proposal for the Administrative RFP the evaluation team reviewed the proposal as either being Acceptable or Unacceptable. The three submissions for the Technical RFP were evaluated and compared using the full set of scoring criteria.

The contract evaluation process resulted in a single firm, CH2M Hill being selected as the principal contractor for both RFPs, but during the negotiation process

CH2M Hill agreed to employ as a sub-contractor Optech Monette, LLC (Anon. 2008) which offered a proposal for providing public works services and had received a higher rating by the evaluation committee in that area (Porter 2006, 145). The contracts were signed on December 20, 2005 which made the CH2M Hill firm the principal contractor responsible for the majority of city functions. One of the key criteria that Porter cites as having swayed the Committee in adopting a competitive contracting model was that it would lower costs. The estimate received from CH2M Hill on the cost of servicing the new city was 25% lower than the Committee's own estimates of what it would cost to produce the same services internally (Porter 2006, 131).

The initial compensation amounts for each agreement were specified in the contract documents. Compensation for the Administrative contract was set at \$11.2 million and the Technical contract was set at \$18.5 million. The language in the agreements explicitly allows for a profit margin to be charged in association with each service provided. This profit margin is discussed in sections allowing for an adjustment to the total compensation level following a reduction in services. It stipulates that the reduction in compensation will be no "less than the actual cost of said services, and the allocated overhead and profit for such services."²⁸ The contract agreements do not define what this profit allocation would be, whether it is a constant percentage or if it is based on whether actual expenditures are less than predicted spending.

Although this study focuses on the initial design of the partnership between Sandy Springs and CH2M Hill, one key adjustment to the structure of the agreement has since

²⁸ Agreement 1: Section 9.5 and Agreement 2: Section 8.5

been made. In 2006 the City Council became concerned that CH2M Hill responsibility for the Financial Services function created the potential for a conflict of interest. On October 10, 2006 the minutes to the City Council meeting state that the City Manager recommendation was to create a position to directly employ a Finance Director. The following justification was given to create this position:

Inherent problems exist from this type of arrangement over financial matters that involve city finances. Financial considerations and issues can not always be considered separately given the nature of providing governmental services. Reasons for separating the financial function from the CH2M Hill contract would be as follows:

- *Increase independence and impartiality with financial decisions.*
- *Improve segregation of duties with authorization, custody and reconciliations functions.*
- *Removes limited ability to make financial decisions and transactions.*
- *Eliminates perceived conflict of interest where the interest of one job contradict another or when public and private interests collide over financial matters or interests.*
- *Instills a sense of loyalty to the City.*²⁹

The City Council subsequently authorized the creation of the new Finance Director position. The office staff remain CH2M Hill contractors, though they are directly overseen by this public official.

This partial adjustment to the contract agreement between Sandy Springs and CH2M Hill highlights the broader challenge of administering a contract city. The broad scope of municipal functions in a single private partnership has little precedent in the history of public management. The key interest in this paper is whether such a combination of functions can exacerbate public officials' challenge of administering the

²⁹ City of Sandy Springs Georgia. (October 10, 2006). Work Session of the Sandy Springs City Council.

principal/agent relationship. Porter argues that “a sense of partnership” between the CH2M Hill firm and city officials prevents the firm from abusing any potential it may have for acting in its own interest at the expense of the city as it fulfills these contracts. However, on whether this mutual appreciation is sustainable, even Porter is uncertain: “Only time will tell whether the partnership will deteriorate into an owner/worker mentality” (Porter 2006, 151). In this analysis I assess the structure of the contracts between Sandy Springs and CH2M Hill as they were initially designed and identify where the potential for conflicts of interest can be found. This would allow the city to identify where it should focus its contract monitoring efforts should its relationship with its contractor deteriorate. It also would also contribute to the literature an assessment of structures and incentives that can arise in this class of comprehensive service contracts.

Theoretical Framework

I approach this analysis of the structures that may exist in contract cities’ private partnership agreements within the framework of principal-agent theory. Principal-agent theory is a well-established component in several fields of social science. The first formal discussion of the theory is by Ross (1973). For a review of how principal-agent models have been applied in a variety of different settings see Eisenhardt (1989). In the context of this essay, I describe public officials implementing a contract city as principals seeking private partners willing to serve as agents. These agents would deliver services according to the terms defined in a contractual agreement. I assume that agents are profit-motivated and that they possess superior information relative to the principals regarding the quality of the work actually performed. By entering into a contract agreement the city unburdens itself of the task of directly producing services for the

public, but also acquires new risks associated with administering the contract and overseeing the agent's performance.

Local officials that are aware of these risks may seek to place structures in the outsourcing contracts that are designed to reduce the threats that are created by the contract city model. As put by Gary Miller (1993, p. 2), "The principal's job is to anticipate the rational responses of agents and to design a set of incentives such that the agents find it in their own interests (given the incentive system) to take the best possible set of actions (from the principal's perspective)." Alternatively, it is also possible that the contract documents contain loopholes or create adverse incentives that increase the potential for the agent to act against the interest of the principal. After the contract has been signed the principal can engage in monitoring, which is costly, to observe actual agent performance in order to enforce the terms of the contract.

The agent's objective is to maximize long-term profits from the agreement. Periodically the agreement must be renewed and the principal has the opportunity to select a different agent. If the principal observes that the agent efficiently produces the contracted services, then the probability of retaining the agent for subsequent periods increases. This induces the firm to operate efficiently. On the other hand, opposing conditions can give the agent an incentive to shirk in its efforts in order to extract short-term gains from the principal without damaging her long-run gains. Weak competition for the contract reduces the likelihood that the city will select an alternative service provider when it is time to renew the contract. A high degree of information asymmetry regarding the true costs of production and the quality of service output can also give an

incentive to the firm to reduce its efficiency. The design of the agreement will reflect the efforts by both parties to secure their long-term interests.

In this section I discuss how context of the contract city model of governance affects the principal-agent relationship. My review of the literature highlights two important factors: the broad scope of services that are outsourced and the relative lack of competition among potential private partners.

Scope

The scope of outsourcing that occurs in a contract city increases the tension inherent to a principal-agent relationship. On the one hand are the potential efficiency gains, particularly the economies of scale that may be gained from outsourcing the majority of public functions to a single private firm. I assume that obtaining these gains is the city's primary purpose for becoming the principal in a contracting agreement. On the other hand, the city must overcome the twin challenges of designing a contract that can properly harness the contractor's incentives to the city's interest and then monitoring actual performance to ensure that the agent complies with the terms of the agreement

The breadth of services outsourced under the contract city model may give rise to unique structures within the contracts that are not present in traditional relationships where only a single service or a relatively small share of total municipal functions are delivered by a single private partner. An example of the type of structure that would be expected to appear in contract city agreements would be features that facilitate the agent's capacity to achieve economies of scale. As discussed in the previous literature review, a key objective for public officials pursuing the contract city model is that they expect to obtain efficiency gains through the private delivery of public functions.

Officials may therefore include elements in the contracts that discuss the private partner's allocation of funds and resources across functional areas within the city. If the private partner is a large firm with other operations outside of the local jurisdiction there may also be contract elements that discuss the allocation of human and physical resources across the larger firm. These elements of contract design would serve the principal's interest by helping to ensure that the promised efficiency gains actually materialize.

Another way that the scope of outsourcing in a contract city may affect the principal-agent agreement is that it may exacerbate the information asymmetry problem. A key feature of the principal-agent relationship is that in most cases the agent possesses superior information regarding the costs of production and the quality of services delivered to the public. Within the context of a contract city the agent is responsible for providing a mix of external services consumed by the public (e.g. road maintenance) and internal functions that provide information and administrative support to city officials (e.g. preparation of regular financial statements for the city and providing advice on capital investments). The combination of these two types of functions in a single outsourcing agreement may increase the information asymmetry. This is because public officials become dependent on the agent for the financial and managerial information that they receive regarding the quality of external service delivery. This creates potential for what I describe as "negative synergies" to arise in which the difficulty of the contract management task for the aggregate contract agreement is greater than the sum of the management costs that would be associated with each function individually. The potential for the agent to suffer from a conflict of interest between its information

production role and its role as a producer of external services is a key factor in creating these synergies.

Principal-agent theory predicts that public officials will respond to information asymmetry by engaging in monitoring activities. Audits, quality of service reviews and direct service monitoring are a few of the types of functions that may be done by public officials to verify performance. These functions incur a cost and are central to the function of contract management. The scope of outsourcing in contract cities may increase the difficulty and costs of monitoring agent behavior. Many functions outsourced are not easily monitored. These include information and administrative functions that do not yield tangible outputs. Also, when contract monitoring activities are also outsourced to other private partners it therefore becomes necessary to ensure that no collusion occurs among the various agents. The concept of “negative synergies” is manifest in contract monitoring because officials must not only monitor the performance of individual functions, but also investigate whether there is any action in conflict of interest

These two issues, the potential efficiency gains from outsourcing and the costs of mitigating the information asymmetry, reflect part of the tradeoff that public officials face as they decide whether to make or buy public services. Entering into a principal agent relationship with a private partner requires the city to allocate a certain amount of its resources to contract management. On the other hand, outsourcing may allow the city to obtain services at a lower cost. These costs and benefits must then be compared with the costs of producing internally. Levin and Tadaelis (2007) explore this tradeoff in their formal transaction cost model of the make-or buy decision for U.S. cities. The authors

find that high costs for monitoring performance, lack of competition in the market for private service production and high sensitivity among residents to changes in service quality are important factors that deter privatization. Their analysis is conducted within the traditional framework of outsourcing in which the scope of privately produced activities is relatively small and managers are able to apply a rational analysis to each potentially outsourced function to identify whether it would be most efficiently produced internally or externally.

The scope of outsourcing in the contract city context changes the way that make-or-buy decisions are made. In a small-scope context, managers marginally assess each municipal function and determine whether it should be produced internally or externally. In a large-scope context, officials assess the overall service delivery regime and decide whether the entire municipal enterprise can be administered through a private partnership. One factor in this comprehensive analysis is that the contract city model allows governments to escape some fixed costs, such as the administration of employee health and retirement plans.

Bradbury and Waechter (2009) note that all of the cases of extreme contracting they review adopted that model during the formation of a new government. Because the entity does not actually exist at the time that costs are being considered, the only information available comes from other governments that are currently delivering services and cost estimates from potential contractors. The lack of information challenges the rational analysis that is assumed in the traditional contracting context and opens the door for ideology and generalized perceptions to play a role in determining the outcome. It is these larger issues of what functions the city will play, the overall cost

efficiencies and the political implications of the new mode of governance that will dominate the discussion. This occurs because the scope of outsourcing which occurs in a contract city raises broader issues that overcome the specific efficiencies of individual functions which are at the heart of make-or-buy decisions in a more traditional context.

Lack of Competition

Another challenge for contract cities is the thinness of the market for large-scale municipal service production. Johnston and Seidenstat (2007, p. 239) argue that for successful outsourcing, “the private sector should be structured such that alternative suppliers ... can compete for contracts ... Without competition, privatization might simply consist of a private monopoly substituting for a government monopoly.” This is especially true for contract cities that require such a broad range of services that relatively few firms may emerge that are able to provide them. In the case of Sandy Springs only a single firm submitted bids for both of the RFPs.

Additionally, the level of competition in the public service markets contract cities purchase from are significantly weakened by the absence of the government as a potential public service provider. In a conventional contracting environment the government can act as a competitor with private firms by reversing the decision to outsource a given function. Bradbury and Waechter (2009 p. 245) argue that reversibility is a problem for contract cities “because the adoption of the strategy at the time of incorporation means that, for many services and programs, there is no in-house expertise or infrastructure on which to fall back.” This gives potential agents an advantage at the initial stage of contract design and municipal incorporation because they can promise service delivery within the necessary time frame. For subsequent renewals of the contract the initial

private partners possess a first-mover advantage relative to other potential bidders because they already possess infrastructure, human capital and direct knowledge of the true costs of production.

The scope of outsourcing and the relative lack of competition in the market for services can impact the relationship between principal and agent in a variety of ways. For this analysis I focus on the contract agreements that govern the principal-agent relationship and explore how these agreements reflect the challenges associated with the contract city environment. In the following section I discuss how I apply this theoretical framework to the actual elements of contract documents.

Data and Research Strategy

The purpose of this study is to examine how the contract city model of governance increases the complexity and challenge of contract management. Within the framework of the principal-agent model, the principal and the agent develop an agreement that creates incentives that should theoretically harness the agent's self-interest towards the achievement of the principal's goals. These incentives are established by designing specific structures in the contract documents. The structures define the service requirements set rewards for good performance and define consequences for any breach of the agreement. Additionally, individual structures also have the potential to create unintended effects that can increase the difficulty of contract management.

I pursue my research objectives by analyzing the text of the contracts that were signed by City of Sandy Springs, GA and the private firm CH2M Hill at the time of the city's incorporation. These documents reflect the incentive structures as they were initially developed between the two parties. In this section I describe how this textual

analysis is conducted so that its output will provide useful information that will contribute to our understanding of the operation of contract cities. To my knowledge, there are no other social science studies that have analyzed the elements of a contract within a comparable theoretical framework. I have developed the following research strategy on my own. I will first provide a brief description of the documents, then present how the elements of the contracts are coded for analysis, and then discuss how the coded elements are assessed under the theoretical framework presented in the previous section.

Description of Documents

The subjects of this analysis consist of two sets of documents that were provided to me directly by the City of Sandy Springs through the Office of the City Manager. Each set pertains to its respective RFP submission and consists of 1) the actual agreement between Sandy Springs and CH2M Hill and 2) an accompanying Scope of Services document that provides greater detail on the nature of services to be provided. The services areas included in each contract follow the same grouping used for the RFPs, as was depicted in Table 2.

The documents follow a legal format. Paragraphs are numbered according to their respective sections and sub-sections and they each contain a single element of the contractual arrangement between the City and the Corporation. From a research standpoint this is useful because it makes it possible to disassemble the document and consider each paragraph a data point for analysis. I use spreadsheet software to manage the individual elements of the documents. I have transferred each document into its own worksheet, with the paragraphs contained in separate rows.

Data Framework

In order to be more precise regarding how the content of the contract documents influence agent behavior, I present the following data framework. This framework describes the mechanism through which a contract transmits a signal that affects the behaviors of both the principal and the agent in the service relationship.

The beginning of the path of influence from the contract to actual behavior is in the text of the documents³⁰. Each paragraph of the documents addresses a single component of the relationship between Sandy Springs and CH2M Hill. These paragraphs are discussed within this framework as individual document elements. The text of each paragraph is identified as a single data point for this analysis.

These document elements combine in various ways to create conceptual structures that are understood in the minds of those that read them. These conceptual structures define the parameters of the relationship between the principal and the agent. They describe the nature of the work that is to be outsourced, the expected behavior that both parties will exhibit and the consequences for both complying with and/or violating the terms of the contract. There does not necessarily need to be a one-to-one relationship between document elements and conceptual structures. Multiple elements can collectively generate a single conceptual structure, and a single element may be mapped to multiple structures.

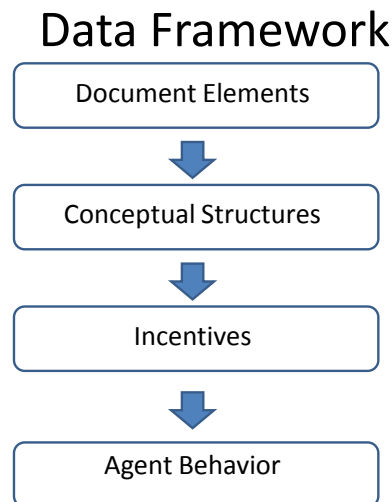
³⁰ It could be argued that there is an earlier stage: the contract writing process where both principal and agent discuss what they want the relationship to be like and transmit those ideas into the contract. There may be a filter at this point where the concepts in the minds of both parties are expressed in writing with varying degrees of accuracy. A thorough analysis of that topic, however, would require venturing into the cognition and psychology of public administration which goes beyond the scope of this paper.

The conceptual structures create incentives that can then be analyzed within the principal agent framework. These incentives work to either align the agent's interest with that of the principal or induce the agent to deviate from the principal's intent. Incentives will interact with the agent's pursuit of profit maximization and lead to behavioral outcomes. The principal will attempt to design a contract where the document elements create conceptual structures that reward good behavior and punish deviant behavior. There is room within this framework, however, for unintended incentives. These may arise if the document elements combine in ways that were not expected by the principals, resulting in conceptual structures that create adverse incentives for the agent.

To rephrase the research objective of this paper within this data framework, the contract city model creates a new context for document elements. This new context arises because the principal-agent relationship in a contract city is burdened with the challenges of an increased scope of contracting and a lesser degree of competition. As a result, new conceptual structures may be generated from the document elements that would not exist if the city operated within a traditional contracting environment. These new conceptual structures may then create incentives that public officials would not have expected. Also, agents may respond differently to contract elements that are found in traditional outsourcing agreements because the issues of scope and competition interact with those contract elements to create new incentive structures. I do not observe actual behavior and so the analysis in this essay is confined to the top three elements of the data framework presented in Figure 1. The empirical objective of this paper is to identify the ways that the context of the contract city impacts the incentives created by the contract documents.

This essay is a single case study rather than a multi-case study and so I do not directly compare the incentives created from contract city document elements with those from traditional city outsourcing agreements. Instead, I assess which incentives are created as a direct result of either the scope of services provided by the contract agreement with CH2M Hill or the relative thinness of the market for comprehensive municipal service contracts. If the incentive arising from a set of outsourced functions would disappear if the services had been outsourced to separate firms then it is identified as being scope-related. Likewise, if an incentive is created due to the relative scarcity of market competition for the contract then it is considered competition-related.

Figure 4.1



Coding of Elements

My approach to analyzing Sandy Springs contract documents begins with a careful reading of the texts and then coding the individual elements of the contracts according to several thematic categories. These categories serve to group by functional

area the conceptual structures generated by the document elements. These categories are displayed in Table 3. Each category is derived from applying the principal-agent framework presented earlier. Because a given document element may be associated with multiple conceptual structures, individual paragraphs may receive multiple codes. All appropriate codes are assigned to each element. I provide a description of each category below.

Table 4.3 Classification Categories

Category	Description
Scope	Elements of the agreements that reflect the large scope of services provided by the private partner.
Human Resources	Elements of the agreements that relate to how human resources are managed by the private partner
Information	Elements of the agreements that outsource information production functions
Direct Service Production	Elements that provide for outsourcing direct service production that will be consumed by citizens
Financial Control	Elements that outsource financial control functions and contract management
Further Expansion of Agreement	Elements that provide for future expansion of the partnership
Trust and Harmonious Relationship	Elements that describe and require a trusting and harmonious relationship to exist between the City and the Corporation
Capital Project Management	Elements that provide for the Corporation to provide either support for or direct oversight of small-scale capital projects
Null	This label is applied to elements of the documents that do not appear to pose significant issues for the purposes of this study.

Scope

The scope category identifies the contract elements that either directly or indirectly address the scale of outsourcing activity that occurs in contract cities. This is one of the broadest identifiers used in this study as the issue of scope is central to what

distinguishes the principal-agent relationships in contract cities from other contracting agreements. I will therefore briefly discuss what features an individual contract element may have in order for it to receive the scope identifier.

The issue of scope can be manifest in two ways: breadth and proportion. Breadth refers to a contract agreement with a single partner outsourcing a large range of municipal functions. Individual contract elements that refer to how resources may be allocated by the private partner across functional areas directly address the issue of breadth. For example, contract language that discusses the sharing of resources across functional areas to obtain efficiencies of scale would be direct examples of breadth. Contract elements may also indirectly affect the breadth of the contract agreement if some set of elements outsources a combination of functional areas to the private partner that create incentives for the private partner to act against the interest of the principal. An example would be contract elements that outsource both the provision of capital project planning and the actual production of the same projects. The combination of these two functions creates the potential for a conflict of interest if the private partner adjusts the project recommendations it gives in order to increase its profits from the actual production of those projects.

Contract elements that reflect the proportion of outsourcing activities contain language that reflects how the municipal government will be administered with few direct public employees. The concept of “hollowing out” in government due a share of municipal functions that are produced externally captures the issue of proportion. Elements of the contracts that either seek to mitigate the issues of hollowing out or that inadvertently increase the potential risks will fall into this category.

I code individual elements that associate with breadth and/or proportion with a single identifier because the issues are closely related and there may be substantial overlap if separate identifiers were used. Also, as the other identifiers are more specific, it is interesting to view the overlap between this broader category and the more specific issues tied to other codes.

Human Resources

This code designates elements of the contracts that are associated with the disposition of the direct employees of the primary contractor and the other human resources that are obtained through the agreement. Under the terms of both agreements, CH2M Hill “shall be solely responsible for all compensation benefits, insurance and rights of the Corporation employees during the course or arising or accruing as a result of any employment...”³¹ The human resource code highlights elements that discuss how contracted employees will represent the city to the citizens and the city’s rights with regard to the retention of individual employees. This designation also highlights areas of the agreement that relate to the risks associated with a workforce that is almost entirely contract labor. These risks would include the loss of workforce and institutional knowledge in the event of severance of the contract and the possibility of employees being transferred elsewhere in the contracting firm’s organization. Another example is the outcome that the contractor set the pay and benefits levels for the majority of the employees producing public services.

³¹ Agreement 1: Section 7.1 and Agreement 2: Section 5.1

Information

Another notable feature of the contract city model is the private production of information used for managerial and financial decision-making. This includes the generation of financial forecasts and the development of financial reports. Even under a conventional service delivery framework, where the scope of outsourcing is relatively small, private production of financial and administrative information would face close scrutiny. This is because the nature of the service does not align with the criteria found in the public administration literature to be predictors of whether a function is a good candidate for outsourcing. Brown and Potoski find that “[s]ervices that are difficult to monitor and prone to opportunism may be riskier candidates for transferring management responsibilities to vendors (2006 pp. 338).”

Assessing the quality of financial reports and economic data is a difficult task on its own because economic conditions change and the city manager likely does not possess all the technical accounting skills necessary to evaluate fully the accuracy and quality of financial information. Although auditing firms are retained to validate the end-of-year financial statements, they are not involved in evaluating lesser financial reports that are produced regularly solely for the purpose of internal consumption. Within the contract city framework there is the added challenge of the risk that the private partner may produce the information in such a way that serves its own interests. One potential example may be presenting financial forecasts that project increased demand for services that the firm is also providing to the city. This may result in expansion of the contract and additional profits for the firm.

Elements of the contracts that relate to the outsourcing of information production activities are classified with the information code.

Direct Service Production

This classification is used to identify elements of the agreements that relate to services that the contractor will provide directly to the citizens of Sandy Springs. This includes descriptions of the nature of the services, performance measurement and compensation.

Financial Control

A broad range of financial control functions are also outsourced in contract cities. This designation is applied to segments of the agreements that contract for contract management services. It also applies to functions such as procurement, revenue collection, account management, and advisement for investment activities. This designation will at times overlap with the information production functions as the production of financial reports and the provision of advice on capital projects have both elements of control and information production.

Further Expansion of Agreement

In cases where the contract city is in a relationship with one primary contractor, as is the case in both Weston and Sandy Springs, it would be expected that the contract be designed with sufficient flexibility as to allow the city to request an expansion or a reduction in services from the contractor as needs arise. This reflects both the city's dependence on its primary partner for essentially all service delivery and the uncertainty that all governments face when developing policies that will meet future service

requirements. This code designates the procedures for the city manager to request additional services both on a one-time and on an ongoing basis and the manner of compensation for these services.

Trust and Harmonious Relationship

This identifier is motivated by Oliver Porter's discussion of how trust and a positive relationship between the city of Sandy Springs and CH2M Hill is one of the essential elements in successfully implementing and maintaining a contract city approach to municipal governance. If these positive personal relationships are so key to the success of the government, then the contract agreements between the two parties may include structures that are intended to foster this type of relationship and protect the city if the relationship begins to deteriorate. Elements of the contracts that refer to the interpersonal relationships and the tone of the interactions between city officials and employees of the contracting firm are coded with this identifier.

Capital Project Management

In addition to providing services that are consumed immediately, contract cities also obtain planning, advisement, construction and maintenance services for capital projects. This code is used to identify elements of the contracts that discuss the types of projects that the private partner is responsible for and how the firm is compensated for those projects.

Null

This designation is applied to elements of the contracts that do not appear to change the task of managing a private contract for services within the contract city framework. This would include language that would be included in typical contracts.

Analysis

The analytical portion of this research strategy consists of determining what types of incentives are created by the conceptual structures originating from the agreement documents. More specifically, I seek to identify how the individual structures influence the task of contract management. This assessment consists of considering two principal questions for each section. First, does the specific contract element contribute to a structure that increases the city officials' capacity to manage the contract relationship? This could be manifested by structures that align the agent's incentives with the principal's or that increase the principal's capacity to monitor the agent's productivity. The second question I examine is whether the contract element creates openings for the agent to pursue its own interest at the expense of the principal. For example, clauses in the contracts that give a single private partner responsibility for both providing consulting advise on which small-scale capital projects to pursue and a procurement contract for the same small-scale projects with a built-in profit margin for the latter may incentivize a firm to recommend that the city initiate more projects than what the actual service requirements of the city merit.

Key Findings

My discussion of the findings from my analysis will loosely be organized according to the coding classification groups that I used to organize the data. However,

because many key findings involve issues that span multiple categorical areas it is not possible to strictly confine my discussion to single categories. I also include in the discussion several recommendations I have developed as possible approaches to address the contract management challenges that are associated with the contract city model of governance. I begin with the issues that involve the most crossovers and that I find to be the most significant and interesting. I then move to the more narrow issues that can be grouped within single categories.

Resource Shifting Increases Contract Management Complexity

The agreement between CH2M Hill and the City of Sandy Springs is divided into two separate contracts for services. The first³² contract is composed of administrative functions while the second covers primarily direct service production. The payments for services were each specified in the initial contracts. The first contract was funded in its first year for \$11.2 million³³ and the second contract was funded for \$18.5 million³⁴. There is language in both contracts, however, that grants CH2M Hill the right to shift resources and funds between the two agreements. This resource shifting is permitted “per the priorities agreed-to with the City Manager so long as such allocations do not adversely affect the City regarding either (1) cost of services under this Agreement, or

³² The designation of ‘first’ and ‘second’ contract follows the designation from the RFP’s which labeled RFP 1 and RFP 2. The first contract refers to the agreement for the provision of Administrative, Financial Community Services, Motor Vehicle, Staffing, and Purchasing, Procurement and Contracting services. The second contract is the agreement for the provision of Public Works, Transportation, Streets, Right-of-way, Facilities, Parks and Recreation, Capital Improvements, Planning and Zoning, Inspections, Code Enforcement, Permitting, Purchasing, Procurement, and Contracting Services.

³³ Agreement 1: Section 9.1

³⁴ Agreement 2: Section 8.1

(2) service quality to the public.”³⁵ So in effect, subject to these requirements, the contracting firm is able to move resources across the two agreements as if it were fulfilling a single contract. This power of resource shifting can be viewed as being a reasonable way to achieve greater economies of scale that can exist from having a single firm provide such large proportion and range of city services. Because the outcome of the RFP process resulted in a single firm receiving both contracts it would appear to serve policymaker’s objective of facilitating economies of scale by allowing funds to move across contracts. The city saves the cost of requiring the private partner to develop protocols that ensure funds from either contract are not comingled. For example, if senior CH2M Hill managers are responsible for service areas under both agreements it would be necessary to keep track of the share of their services allocated to each contract.

Allowing resource shifting may increase the cost of to the city of monitoring the true costs of providing services. Within the context of a principal-agent framework, it would be expected that the principal allow the agent to achieve a certain rate of return and a normal level of profits for its services. This would give the agent the incentive to reduce costs while maintaining the specified level of service in order to achieve profits and return value to its shareholders. Periodically, however, the contract would be renegotiated and the city would have the chance to assess whether the agent has cut costs enough to receive a rate of return that exceeds the normal market rate. If this is the case then the city should be able to rebid the contract and receive the services at a lower cost and the firm’s return would return to the normal market rate. Presumably, the normal

³⁵ Agreement 1: Section 2.3 and Agreement 2: Section 2.3

market rate would be determined by taking bids from other firms interested in competing for the contract. This may not be feasible, however, if no other firms offer bids or if the incumbent firm is advantaged in the bidding process due the economies of scale it enjoys.

Resource shifting in a contract city framework would allow the private partner to transfer resources from profitable areas to lower margin areas to achieve an average rate of return over the entire contract. Because a contract city has such a broad range of services outsourced in a single contract, it may be difficult for the city officials to untangle the resource shifting that has occurred in order to assess which functional areas are yielding a higher than normal rate of return for the contractor. Identifying these higher profit areas is important for the city so that it can negotiate for a lower compensation amount during contract renegotiations. Under a conventional contracting framework each individual service area would likely have its own contract and multiple firms would provide the outsourced segment of government services. Resource shifting potentially increases the difficulty of ensuring that the private partner is not achieving a higher than normal rate of return.

Another issue associated with resource shifting is its implications for the city's compliance with Governmental Accounting Standards Board (GASB) rules regarding the Statement of Activities. Should contract cities that allow resource shifting present the allocation of funds within the Governmental Activities function before or after the private contractor shifts funds across functions? For example, among the sub-categories that fall under Governmental Activities, two significant sub-categories are General Government and Public Works (City of Sandy Springs GA, 2007). A shift of resources from Agreement 1 to Agreement 2 could result in funds that were initially allocated to General

Government functions providing support to Public Works. The question then arises whether the city is reporting in the Statement of Activities how it allocated resources originally to its contractor or how the contractor ultimately allocated those funds. The contract documents are silent on which method should be used. The latter approach seems clearly preferable, however, so that the financial statements accurately account for the use of public resources. The language in the contract documents that resource shifting is subject to the “priorities agreed to with the City Manager” suggests that the City Manager, a public employee, approves reallocations. There is no specific guidance in the contracts to detail when approval is needed and how it is granted. There is also no language in the contracts regarding how such transfers would be documented or reported within the financial statements. A review of Sandy Springs’ Consolidated Annual Financial Report for the fiscal year ending on June 30, 2006 shows that the document does not contain any mention of these types of transfers. The interested reader can examine the Budget and Actuals statement from the Notes to the Financial Statements by opening the attached file.

I make the following two recommendations for cities that allow resource shifting across multiple contracts awarded to a single service provider.

Recommendation 1: Cities that allow their contractors to engage in resource shifting across contracts should request documentation of the flow of funds so that the pre- and post-shifting resource allocations can be compared with actual spending. This will provide city officials with better information on the true cost of service provision.

Recommendation 2: Specify that the Statement of Activities reflects shifting of resources across contract agreements. The Notes to the Financial Statements should

detail the size and nature of these allocations. This would be supported by documentation of the City Manager's approval of these transfers.

Potential Expansion of the Contract

One of the challenges of contract design at this scale is ensuring that the agreement is adequately clear and focused so that the private partner's responsibilities are clear, yet flexible enough to be able to meet unforeseen or changing service needs. It would be expected, therefore, that a contract city agreement would include structures that provide for the expansion of services when determined necessary by public officials. The City Manager of Sandy Springs is the public official that is charged with administering the contract and, subject to authorization by the City Council, is responsible for requesting and negotiating for expansions of services. The contract documents contain multiple elements that develop a flexible framework for changing service requirements.

Both contract documents³⁶ contain elements that provide for written requests for services that are not included in the Scope of Services documents. Within five days of receipt of the change order CH2M Hill agreed to provide a price to the additional services. If that price is agreed upon the additional services will be invoiced in the next monthly payment cycle, unless otherwise specified. If the change order requests an additional ongoing service rather a function provided on a one-time basis then the Scope of Service document will be adjusted and the monthly compensation amount will similarly reflect the new agreement.

³⁶ Agreement 1: Section 9.2 and Agreement 2: Section 8.2

What are the incentives associated with a structure that makes the future scope of services more flexible? Having structures that facilitate the future expansion of services may not only lower the administrative cost to the city of changing the agreement, but it also may increase the likelihood that the firm will present projects to the city that would merit service expansion. In other words, does the door swing both ways for allowing new service orders into the contracting agreement? Because the contracting firm is allowed to include a normal rate of profit in the price it gives for change orders, it has a financial incentive to expand services when possible. This creates one of the most challenging incentive problems for the contract city model. Within this contract city framework, the private partner is also responsible for generating economic forecasts³⁷, research on current and future trends for the city³⁸, financial reports³⁹, and developing the draft of the city budget for approval⁴⁰. The potential exists for the firm to structure these documents to present biased information to the city that would indicate that new services are required to meet the needs of the city. Detecting this type of bias would be difficult because it would likely require an assessment of the technical details of the process for producing fiscal information. The city manager, with a limited staff⁴¹ independent of the private contractor, may not have the capacity to perform this evaluation. It may therefore be necessary to acquire services from other third party evaluators to validate fiscal information on a periodic basis.

³⁷ Scope of Services 1: Section 1.2.8

³⁸ Scope of Services 1: Section 1.1.2.1

³⁹ Scope of Services 1: Section 1.2.1.4

⁴⁰ Scope of Services 1: Section 1.2.7

⁴¹ At the time of incorporation the only direct employees of Sandy Spring were the Board, the Mayor, the City Manager and the City and Court Clerks.

An additional provision for the expansion of services is made for the event that Sandy Springs obtains additional services from third parties other than CH2M Hill and its subcontractors. If those other third parties fail to meet their service obligations then “any additional services performed or costs reasonably incurred by the Corporation in conjunction with compensating for the failure of the third party to fulfill its obligations shall be handled as a change to this Agreement...”⁴² This structure is key because it reaffirms the CH2M Hill’s role as the agent of last resort should other contractors fail to deliver services. This structure is designed to protect the city from disruptions by ensuring a continuation of services. In a conventional contracting framework where the share of outsourced services is relatively small there would be other municipal employees that could be temporarily reassigned to provide services during a disruption. That capacity is not present in contract cities and they must therefore ensure that one of its private service providers can act as the agent of last resort.

There is the potential for an adverse incentive with this structure, however, because in the Sandy Springs/CH2M Hill relationship, the agent of last resort also provides the city with contract management services⁴³ for third party contractors. This creates a situation where the agent responsible for evaluating the other third party potentially could replace that party. The potential threat would be that the primary firm takes advantage of its evaluator role in order to learn production techniques and business strategies of the third party firm and then uses its position to replace the third party in

⁴² Agreement 1: Section 2.4 and Agreement 2: Section 2.4

⁴³ Scope of Services 1: Section 1.1.1.1- 1.1.1.4

providing that service. The city may become liable to litigation if the third party firm sues the primary firm for this type of abuse.

Another area where the potential for service expansion may cause a scope-related management challenge is the outsourcing of several financial functions. CH2M Hill is responsible for administering the city's accounts payable and receivable. This includes operating the purchase ordering system "such that timely payments are made on behalf of the city..."⁴⁴ Additionally, Sandy Springs outsourced to CH2M Hill the collection of taxes and fees. Thus, the firm's interaction with third-party firms delivering service to the City include contract management and assessment, payment, as well as serving as a possible replacement for the functions delivered by the third parties. This combination has the potential to give the private partner significant leverage over third party firms. It also provides access to confidential tax information of other private entities that could provide an advantage in bidding for future contracts with Sandy Springs or other local governments. If these third parties are large firms, where services delivered to the City of Sandy Springs are a relatively small portion of their entire enterprise, then this leverage is likely to be small, but if Sandy Springs is employing small, locally controlled firms to provide services then it is possible that the primary firm may be able to exert influence over the private partner in order to serve its own interest.

The contracts documents also task CH2M Hill with providing the city with a variety of procurement related services. These include:

⁴⁴ Scope of Services 1: Section 1.2.5.1

- Making recommendations to develop procurement policies that are consistent with state and local law⁴⁵
- Assist in the selection of vendors⁴⁶
- Prepare requests for proposals to be distributed to vendors and suppliers⁴⁷
- Prepare and process purchase orders⁴⁸

Adding the ability to influence which vendors are selected to the previously mentioned administrative challenges would appear to strengthen the primary firm's position in negotiating with other firms that would try to do business with the city.

Both contract documents include language that require the CH2M Hill firm to disclose any potential conflicts of interest⁴⁹ arising from relationships with other entities. These statutes also prohibit employees of the private partner to hold other employment that is "antagonistic or hostile" to the City of Sandy Springs. Also prohibited are kickbacks to employees of CH2M Hill for delivery of services and payments from CH2M Hill to persons associated with the City of Sandy Springs in order to form a contract for services. One notable absence is that there is no explicit prohibition for employees of the city or members of the board to enter into the employ of CH2M Hill immediately after separating from public service. This segment of the agreement may be strengthened by a

⁴⁵ Scope of Services 1: Section 1.2.12.1

⁴⁶ Scope of Services 1: Section 1.2.12.2

⁴⁷ Scope of Services 1: Section 1.2.12.4

⁴⁸ Scope of Services 1: Section 1.2.12.5

⁴⁹ Agreement 1: Section 17.1-17.5 and Agreement 2: Section 16.1-16.5

required waiting period between separation and new employment with the primary contractor in order to prevent jobs from being offered as replacement for kickbacks.

Finally, there is language prohibiting collusion between CH2M Hill and other parties contracted to provide services to the City, or any joint business ventures with other contract providers without the approval of the City Manager. These structures of the contracts set the expectations for the agreement and allow the City to take punitive action in the event that the private partner is found to have acted in conflict of interest. No explicit discussion appears in the contract documents regarding CH2M Hill providing services to other cities, though if a nearby municipality were both providing services to Sandy Springs and receiving services from CH2M Hill that would appear to fall under the disclosure requirement.

Recommendation 3: Periodically obtain third-party validation of the financial and economic information produced by the primary contractor.

Recommendation 4: Either separate the functions of agent of last resort and contract management for third-party firms, or maintain additional vigilance in the relationships among contractors.

Recommendation 5: Give extra scrutiny to the relationships between the large primary contractor and smaller third party contractors, especially those where the preponderance of their business is with the city.

Recommendation 6: Regulate the reemployment of city officials and employees by the primary contractor. Consider requiring a waiting period between separation from the city and employment by the contractor. Require city officials to disclose if they enter

into any discussion with the primary contractor regarding potential employment opportunities.

Termination of the Agreement

The degree of outsourcing in a contract city both in terms of breadth and proportion creates the risk of government failure should the relationship between the city and its primary private partners deteriorate. Several elements of the contract agreements discuss the circumstances that would lead to a termination of the relationship between the City of Sandy Springs and CH2M Hill. There are also contract elements that develop structures designed to protect the city from severe service disruptions.

Two types of termination are discussed in the contract documents: termination of the entire agreement and partial termination of specific services. Termination of the entire agreement may be initiated by either the City of Sandy Springs or CH2M Hill at either's discretion with or without cause⁵⁰. For both parties the termination of the agreement would go into effect one hundred and eighty days after written notice had been given to the other party. The City of Sandy Springs is also given the ability to terminate the agreement in its entirety without any advanced notice in the event that "a vote by the Board of Directors, officers or employees to transfer of a controlling interest in Corporation (which shall be defined to mean more than 50% of the ownership interest) to a non-related entity."⁵¹ This structure protects the city from the event that ownership of

⁵⁰ Agreement 1: Section 12.1-12.2 and Agreement 2: Section 11.1-11.2

⁵¹ Agreement 1: Section 12.2 and Agreement 2: Section 11.2

its primary service provider transfers to an entity that may be hostile or antagonistic to the City of Sandy Springs.

Complete termination of the agreement may also result from the City failing to appropriate sufficient funds through its annual budgetary process. The contract documents state that the agreement is “contingent upon sufficient appropriation and authorization being made annually by the City Council” at least 120 days prior to the renewal period⁵². If the appropriation is not completed in this time frame then the agreement will be terminated following the City giving written notice to the CH2M Hill. This clause may increase the risks associated with the budget process in contract cities. Failure to appropriate funds on a timely basis in a conventionally governed city may lead to a continuing resolution with temporary funding or result in temporary layoffs and government shutdown. Once the budgetary problems are resolved and an appropriation is made, however, it would be relatively straightforward to restart service delivery as the public bureaucracy and employees would presumably be available to return to duty. In contrast, a contract city that fails to appropriate funds for the year may lose its ongoing relationship with its primary contractor and be required to go through the RFP process and review bids for new service providers before services can be reinstated. Having established that budgetary failure may occur in that city, future contract negotiations may result in terms that are less favorable for the city.

The high cost for contract cities of failing to adopt a budget potentially increases the likelihood of a holdout problem on the city council. The last member of the council

⁵² Agreement 1: Section 12.6 and Agreement 2: Section 11.6

needed to approve the appropriation may be able to extract concessions from other members in order to avert termination of the city contract. The holdout problem cannot be addressed by adding structures to the contract because it is external to the principal-agent relationship between the city manager and the private firm. This problem would need to be addressed with changes to the rules regulating the appropriations process for the city council. An assessment of how the contract city model may require changes to the political structure of the city itself is outside the scope of this paper, but it certainly is an important research question raised by this analysis.

Partial termination of the agreement is also provided for as long as the City gives written notice to CH2M Hill at least 60 days in advance⁵³. In the event of a reduction or elimination of services the City Manager and CH2M Hill will come to an agreement on how much the compensation amount shall be reduced accordingly⁵⁴. These elements of the contracts would allow the city to make adjustments to changing economic conditions, such as rapidly declining revenue flows necessitating mid-year cuts to services.

At an even smaller level, the City Manager has the right to require CH2M Hill to transfer any of its employees assigned to providing service to Sandy Springs to a different position within the city or to a position outside of the city. This power is limited by language that requires the City Manager to use “an objective standard based upon job performance” when making a transfer request⁵⁵. This language allows the City Manager

⁵³ Agreement 1: Section 12.3 and Agreement 2: Section 11.3

⁵⁴ Agreement 1: Section 9.5 and Agreement 2: Section 8.5

⁵⁵ Agreement 1: Section 7.6 and Agreement 2: Section 5.6

an approximation of the ability to dismiss individual employees for cause despite the city staff being actually employees of CH2M Hill.

The issue of how the city budget affects the terms of the contract is further complicated because the preparation of the budget is outsourced to CH2M Hill. The annual budget is prepared by the firm and submitted to the City Manager⁵⁶. Other City Departments not administered by CH2M Hill receive assistance in preparing their own departmental budgets from the contractor⁵⁷. Also, budget materials used in “budget meetings, hearings, and agenda meetings” are provided under the agreement⁵⁸. The combination of these functions places considerable responsibility in the design of the budget in the hands of the private partner. After submitting the budget to the City Manager, the Mayor’s office will receive the budget for comment and review and it is then sent to the City Council for approval⁵⁹. So there are at least three reviews by public officials of the budget materials prepared by the private firm before it is voted upon by the council. These reviews will help ensure that the content of the budget aligns with public interest. Nonetheless, the work done by the private partner on the budget will certainly influence the budget process.

The potential for a primary contractor to influence the city budgets for its own interest could be compared to the traditional model of budget maximizing bureaucrats introducing slack into their budget requests (see) . One key difference, however, is the

⁵⁶ Scope of Services 1: Section 1.2.7.1

⁵⁷ Scope of Services 1: Section 1.2.7.2

⁵⁸ Scope of Services 1: Section 1.2.7.3

⁵⁹ City Charter of Sandy Springs GA. Section 5.03 and Section 5.04. ONLINE: <http://www.sandyspringsga.org/City-Government/City-Charter>

scope of budget preparation performed across all departments of the local government. While individual departments are competing with each other for budget dollars, a single firm that administers multiple departments can collude with itself to generate a set of departmental budgets that serve its interest.

Another element of the contracts dealing with contract termination is language that defines a default by the private partner on one of the agreements as a default on the other agreement⁶⁰. This structure would allow the City to sever its entire relationship with the private partner for cause should one element of the service agreement be violated. This protects the city from having one segment of its relationship being discontinued under the no-fault termination rules, while the other being subject to the default rules. This language does, however, come with some associated risk, as it may increase the risk to the entire service delivery enterprise of a break in service capacity should any of the segments of the agreement go into default. Under a conventional contracting framework, the city may have multiple private partners and the default of one would not affect the city's relationship with any of the others. The one caveat to this issue is that the city does not have to find both agreements in default, only that it may elect to do so. Before exercising this clause the city officials would need to carefully weigh whether a default on a single service responsibility merits abandoning the entire relationship. This appears to be part of the tradeoff for the gains to scale of having a single private partner – all the eggs are in one basket.

⁶⁰ Agreement 1: Section 13.5 and Agreement 2: Section 12.5

The contract documents also provide for a transition period should the agreement between Sandy Springs and CH2M Hill be terminated. A transition period is provided for in both agreements that shall last the lesser of ninety days or the point at which the city is able to provide for a continuation of services on its own⁶¹. More importantly, the contracts provide the city with the right to offer direct employment to employees of CH2M Hill if the agreement is terminated. This would lower the city's cost of finding a qualified workforce and training new employees in their duties. Although the corporation could presumably transfer members of its Sandy Springs workforce to other divisions, the loss of the contract's revenue stream would likely result in most employees losing their employment.

In the event of breach of contract by either the city or the primary firm it is also likely that one party would bring a civil case against the other. Several elements of the contract documents define the extent to which both parties can be held liable for damages. The agreement states that CH2M Hill "shall indemnify, defend and hold harmless the City ... against any and all liability, suits, actions, damages, costs, losses and expenses ... arising out of any errors, omissions, willful misconduct or negligent acts of Corporation, its officials, agents, employees or subcontractors..."⁶² This places the contracting firm liable for service failures such as incorrect collection of taxes or fees or injuries. Few firms would undertake such a risk without limitations and the Sandy Springs contract also includes a limitation on CH2M Hill's potential liability. The aggregate fines and civil penalties that CH2M Hill can be liable for is capped at \$150,000

⁶¹ Agreement 1: Section 14.1,14.3 and Agreement 2: Section 13.1, 13.3

⁶² Agreement 1: Section 15.1 and Agreement 2: Section 14.1

per year across any federal, state or regulatory agency⁶³. This type of limitation may be necessary in order to entice a firm to provide such a broad scope of services, but it may also create adverse incentives for the firm if it reaches the liability cap. At that point the city is financially responsible for any further damages assessed due to contractor negligence and the only policy option available would be to terminate the contract.

Recommendation 7: Conduct a fiscal impact study of replacing the services provided by the primary contractor before determining to sever the agreement.

Recommendation 8: If the primary contractor reaches the cap of financial liability for fines and penalties evaluate whether the city's potential liability for further damages outweighs the value of retaining the contractor.

Financial Information

The service agreements outsource to CH2M Hill the production of a variety of financial and economic information. Among these responsibilities is assessing on behalf of the city changes in the cost of factors of production for municipal services. City officials likely have limited resources to validate these cost estimates independently, though they could request that the firm explain the development of any cost figures presented. These cost estimates are important to the contract agreement because they are used in periodic negotiations regarding adjustments to the rate that CH2M Hill is compensated for the services it provides⁶⁴. The compensation formula included in the contract does not automatically adjust for increases in the cost of production, but there is

⁶³ Agreement 1: Section 15.5 and Agreement 2: Section 14.5

⁶⁴ Agreement 1: Section 9.4 and Agreement 2: Section 8.4

language that allows CH2M Hill to renegotiate the compensation formula with the City Manager with any agreement subject to City Council approval. The contract also stipulates that cost-related increases to the compensation formula cannot exceed 9% in a given year. The cost of production estimates would likely play a significant role in determining whether an adjustment for the cost of production is warranted.

The key issue with this arrangement is that in the contract city framework the city has little analytical capacity to validate this information on its own and is therefore in a compromised negotiating position for these cost adjustments. In a traditional city there would be public employees of a city budget office that could validate the figures and conduct a comparison with third-party data. Also, in a traditional contracting framework the private firm would have pressure from competition to provide accurate cost estimate data. The thinness of the market for comprehensive municipal services, however, has the potential to lessen the pressure from competition.

Recommendation 9: In the event that a contract city enters into negotiations with its primary contractor over the cost of factors of production the city should obtain a third-party validation of the economic data used to justify the changes to the compensation formula.

Capital Projects and Investment

The City of Sandy Springs contracted with CH2M Hill to acquire a comprehensive set of services pertaining to cash investments and capital project planning and implementation. The firm's capital project services consist of "providing coordination and recommendation to the City on an annual basis as to the capital program requirements in future years, which includes the scheduling of capital program

projects⁶⁵.” The agreement stipulates that these services only pertain to small-scale capital projects of a value less than \$50,000. Capital project administration services for larger projects may be requested under the service change procedures. The firm will also assist the city in obtaining financing for capital projects, maintain the capital projects fund in the city finances and make budgetary recommendations for financing projects over time⁶⁶. The investment-related functions outsourced through this agreement include developing procedures that will keep the city in compliance with Government Finance Officers Association practice and State law, selecting an investment firm, and producing reports, statements and cash flow analyses that will allow the city officers to evaluate the performance of the investment strategy⁶⁷.

These services introduce long-term planning issues that would not be present in most traditional service arrangements. Assessing whether the agent has acted in the principal’s interest with respect to these services requires determining whether performance has been acceptable in both the short and long term. If the capital or investment planning horizon goes beyond the span of the contract renewal period, it is not clear that a contractor will have the correct incentives to maximize value over the correct time span. For instance, if a firm is giving advice to a contract city regarding a debt service plan for an imminent bond issuance, will the firm’s advice on the timing of the repayment plan be influenced by the contract renewal schedule? The firm may have

⁶⁵Scope of Services 1: 1.2.2.1

⁶⁶Scope of Services 1: 1.2.2.3-1.2.2.4

⁶⁷Scope of Services 1: 1.2.3.1-1.2.3.3

an incentive to make the city's finances look their best during the season when its renewal will be assessed by the city manager and the city council.

Possibly more troubling is the potential for conflict of interest if there is collusion between the primary contracting firm and the bond underwriter. Rule G-23 of the Municipal Securities Rulemaking Board stipulates that “[n]o broker, dealer, or municipal securities dealer that has a financial advisory relationship with respect to a new issue of municipal securities shall acquire as principal either alone or as a participant in a syndicate or other similar account formed for the purpose of purchasing, directly or indirectly, from the issuer all or any portion of such issue, or act as agent for the issuer in arranging the placement of such issue...”⁶⁸ By combining the role of providing financial planning advice and playing matchmaker between the city and a financial institution there is potential for the primary contractor to enter into a relationship with the financial institution that may qualify as a ‘syndicate’. It is unclear what type of information and negotiations would pass between the primary contractor and the various financial firms it encounters in the market before a single firm is selected and recommended to the city. Although any collusion would violate the contract elements that require the disclosure of any outside relationships with third-party firms and potential conflicts of interest, it would be very difficult for city officials to actually monitor this behavior and determine whether to take action.

⁶⁸ Municipal Securities Rulemaking Board. “MSRB Rule G-23 – Activities of Financial Advisors.” ONLINE. Accessed Jan 31, 2011. Available at: <http://www.msrb.org/Rules-and-Interpretations/MSRB-Rules/General/Rule-G-23.aspx>

The task of selecting a bank creates another area where there is the potential for collusion. Sandy Springs has contracted CH2M Hill to “[a]ssist the City in selecting an investment firm that will invest City Funds at the direction of City Manager and in accordance with GFOA policies and State law.”⁶⁹ If the primary contractor has a prior relationship with a financial firm it may steer the city to that firm in return for financial benefits. The extreme reliance on the principal contractor for advice in obtaining financial services leaves city officials vulnerable.

The threat of potential violations of rule G-23 has already been raised for the conventional contracting context. Tamar Frankel (2007) raised the issue that some brokers have contracted with cities to provide financial advice and then have terminated the relationship to then subsequently begin a new relationship as bond underwriter. Frankel’s point that while the rule only prohibits firms from providing both types of services simultaneously, serially providing both services to skirt the rule still allows for a significant conflict of interest because the firm has developed a relationship of trust with the issuer and could potentially capitalize on this trust. On May 27, 2011 the MSRB approved amendments to rule G-23 that prohibited this practice (Municipal Securities Rulemaking Board, 2011). The extreme dependence of a contract city on its primary service provider can create a similar degree of trust that may leave the city vulnerable to a conflict of interest.

Recent changes to the Municipal Securities Rulemaking Board (MSRB) under the Dodd-Frank Wall Street Reform and Consumer Protection Act have expanded the

⁶⁹ Scope of Services: 1: 1.2.3.2

MSRB's role to include the protection of state and local bond issuers. Part of the new regulations require that "municipal advisors" register with the SEC. The MSRB's has issued statements explaining that:

Municipal advisors also include firms and individuals that solicit business from municipal entities on behalf of broker-dealers, banks, other municipal or investment advisers to secure certain types of investment banking, financial advisory or investment advisory work with municipal entities, such as public pension funds, 529 plans, local government investment pools and other state and local governmental entities or funds. These municipal advisors are sometimes referred as consultants, third-party marketers, placement agents, solicitors or finders.

The investment services that CH2M Hill provides to the City of Sandy Springs appear to qualify under this definition of municipal advisor. These services are:

1. "Assist the City in the development of investment policies and procedures pursuant to Government Finance Officers Association of America (GFOA) and State law⁷⁰."
2. "Assist the City in selecting an investment firm that will invest City Funds at the direction of City Manager and in accordance with GFOA policies and State law⁷¹."

⁷⁰ Scope of Services 1: Section 1.2.3.1

⁷¹ Scope of Services 1: Section 1.2.3.2

3. “Produce investment reports, including cash flow analysis and modeling stating the effectiveness of the chosen investment policy, on a quarterly basis⁷².”

Recommendation 10: Remove the role of selecting a bond underwriter from the firm responsible for providing capital finance advice. Monitor any contact between firm providing advice and the underwriter.

Recommendation 11: Evaluate the recommend bond repayment plan in light of the contract renewal schedule.

Recommendation 12: Require that primary contractors offering CH2M Hill-type financial advisement services register with the SEC as Municipal Advisors.

Recommendation 13: When contracting for advice on finding banking or other financial service providers, officials should request two or three potential providers that can then be compared on the basis of rates and service to mitigate the potential for collusion in the matchmaking process.

A final consideration of the capital advisement role is that it is also combined with the procurement function. This means that the private partner will receive a normal rate of profit on providing the resources for the capital improvements that it recommends to the city. There is potential here for an additional conflict of interest if the firm begins to recommend that the city undertake more projects than is economically efficient. Because of the information dependence of the city on its private partner, this is another area where

⁷² Scope of Services 1: Section 1.2.3.3

it may be necessary to conduct periodic third-party reviews of the economic merits of the capital investment strategy.

Recommendation 14: Obtain periodic external evaluations of the economic merits of the capital investment plan recommended by the primary contractor in order to limit the potential for conflict of interest.

Relationship of Trust

Noted earlier in this paper, Oliver Porter acknowledged that the City of Sandy Springs is highly dependent on its private partner performing due diligence in fulfilling the service agreement, but that a relationship of trust existed between city officials and the corporation's representatives at the beginning of their relationship. One of the key threats to the city, however, is that this harmonious relationship may erode at some point in the future as elected officials are replaced and the city and corporate workforces change over time. The designers of the contract documents included elements that attempt to mandate that the harmonious relationship be maintained as an essential part of the service agreement. There are also contract elements which are clearly designed as a reaction to the unsatisfactory relationship that previously existed between the citizens that formed the new city of Sandy Springs and the Fulton County government.

Both contract documents include language specifying that the "Corporation shall, at all times, foster and maintain harmonious relationships with the members of the City Council, all employees of the City, all employees of the City's contract services providers

and all City's residents, and shall represent the City in the best light possible⁷³.” This language is included prominently in the General Services section of the contracts. It is not clear how this relationship would be assessed or what types of actions would be taken over time to maintain it. It appears that this language is in place to allow the city to take action when it determines that the relationship has faltered.

Other contract elements which specify specific behaviors shed further light on what is expected in a harmonious relationship. One element which discusses the operation of phones during business hours specifies that all incoming calls will be answered by actual people and not through the use of automated attendants⁷⁴. Another requirement is that the code of conduct for corporate employees will emphasize that “rudeness and impoliteness toward any person is unacceptable conduct and will not be tolerated⁷⁵.” These elements of the contract documents reflect the historical context of the development of the City of Sandy Springs. Because most contract cities are formed in the process of municipal incorporation it is likely that a similar history of antagonism between the preexisting government framework and the citizens groups that formed the city will be reflected in the contract documents.

Discussion

By assessing the features of the contracts between the City of Sandy Springs and the private firm CH2M Hill, I believe that I have identified multiple features of the principal-agent relationships in contract cities that are not present in traditional municipal

⁷³ Agreement 1: Section 2.6 and Agreement 2: Section 2.6

⁷⁴ Agreement 1: Section 6.6

⁷⁵ Scope of Services 1: Section 1.2.11.2

public-private partnerships. The most notable of these features are those that are associated with interactions between outsourced functional areas. I find in the contract structures the potential for “negative synergies” to exist which raise the cost of monitoring and managing contractor performance above what would be required if the functions were individually outsourced to separate contractors. I also observe beneficial structures placed in the contracts that are designed to prevent these additional costs and to achieve the efficiency gains that the contract city model promises.

Another key feature that distinguishes outsourcing decisions in contract cities is that the traditional analytical assumption that cities evaluate the merits of outsourcing each function individually does not appear to hold in this governance context. One cause of this is that the contract city model tends to be adopted by municipalities at the time of incorporation and it therefore necessarily involves a discrete shift to near 100% external production of municipal functions, rather than a gradual adjustment towards increased outsourcing. The other key contributing factor is the role of ideology and the reliance on contractor cost projections for making the evaluative decision, rather than using historical cost estimates of internal production. Because the contract city model is most often adopted by new cities there is no historical data to use and therefore the public officials are either making estimates based on the costs of other government units or using information that they receive from their potential contractors. These factors suggest that the traditional framework used to study outsourcing may need to be reevaluated when it is applied to contract cities and that further research into this area of study is definitely called for.

The two key factors that I identify as being responsible for creating these new features are the scope of services outsourced by contract cities and the thinness of the private market for comprehensive municipal service delivery. These two concepts were first identified in the literature on contract cities and in the historical documents describing the development of the City of Sandy Springs. The textual analysis research methodology used in this case study has helped reveal how the influence of scope and market depth has manifested in the structures embedded in the contract documents.

For practitioners in this field this research highlights several areas of contract management that merit special attention because of the increased potential for conflicts of interest. I wish to reiterate that this paper is confined to the incentives and the potential behaviors that may be spurred on by them, but in no way does it reveal any actual behavior on the part of CH2M Hill in conflict of its interest to provide services to the City of Sandy Springs. The findings and conclusions drawn from this research should be a guide to both public and private partners on how to design appropriate contract structures so as to protect both participants in contract agreements.

This paper opens several doors to future research. One potential avenue to extend this work would be to more formally develop the outsourcing decision contracting officials face within the principal-agent framework. This may serve to clarify the distinction between a traditional contracting decision and this extreme case of outsourcing. A key feature of such a model would be to explicitly model the monitoring cost interactions across individual functions within the contract. The public officials would then weigh the cost of the contract net of these “negative synergy” monitoring costs, but also including the potential scale efficiencies that a comprehensive contract for

services would provide. Other options that the official may face would include internal production, but with imperfect information about the true costs of internal production, and multiple discrete contracts.

Another potentially fruitful line of research would be to gather updated data on the prevalence of the contract city model across the country and more broadly assess their contract management practices. There is a sense in the literature that the contract city is a new form of governance that may be adopted by many more cities. Five years after the incorporation of Sandy Springs it would be interesting to see how many other communities have adopted this model and whether similar contract structures can be found in them.

The implications of these findings for the study of public financial management and regulation also raise a number of interesting questions for the study of local outsourcing at large. How many local governments are receiving financial advice from private contractors who are also playing matchmaker between the governments and financial intuitions when it comes time to issue public debt? Are these firms acting in response to the Dodd-Frank Act and registering as Financial Advisors? If so, what has been the impact of registration on local government's financial activities? The issue highlighted by this case study, how the combination of services in a single contract can increase the potential for conflict of interest, is very relevant for public financial services regulation.

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